CHARLES UNIVERSITY

Faculty of Physical Education and Sport UK

Department of Physiotherapy

Generalized Anxiety and Panic Disorder

Intervention of Physiotherapy

Master thesis

Supervisor:

PhDr. Daniela Stackeová, Ph.D.

Author:

Pernille Eide

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ABSTRACT

Background and objectives: Anxiety disorders are a group of mental disorders that include generalized anxiety disorder (GAD) and panic disorder (PD) among others. Anxiety disorders are among the most common of all mental disorders and, when coupled with an awareness of the disability and reduced quality of life they convey, they must be recognized as a serious public health problem. The objectives of this review was partly to give an overview of what we know of GAD and PD from going through literature, together with how the generalized anxiety disorder and panic disorder can be presented in the patients with relevance to physiotherapy and different treatment possibilities by intervention of the physiotherapist.

Methods: Based upon that background the thesis reviews literature as full text articles dealing with GAD and PD (anxiety disorder), from electronic searches with Pubmed, Medical Journals, Physiotherapeutic Journals, and health care sites. Information from books and journals relevant to health care professionals was also reviewed.

Results: Many studies that evaluate the effectiveness of a physiotherapeutic intervention treating a somatic disorder, including pain, have results that indicate reduction in anxiety scores or sensation; however, the overall reporting of studies linked directly to the role of physiotherapy in PD and GAD was poor.

Conclusion: In an effort to begin to understand the link between PD and GAD to somatic symptoms and the relevance of intervention of physiotherapeutic knowledge of these disorders, the conclusion from the review of the literature is that it is of great importance to be very conscious of those psychological conditions that often presents itself as somatic burdens, as it may be the cause of many typical physiotherapeutic examination symptoms and/or the symptoms can lead to development of PD and GAD.

DECLARATION

I declare that this Master Thesis is based entirely on my own individual work. All information used is presented in the reference list at the end.

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Pernille Eide

PREFACE

In 2008, circumstances made me experience how emotional stress and dysbalance can affect the whole body, and by that I mean not only the feeling of fatigue, lack of energy etc, but genuinely felt somatic pain, decreased function and respiration difficulties. This made me even more interested in the amazing complexity of our mental and physical processes and the holism and unity of a human being. Generalized anxiety and panic disorder are two of the most frequent mental disorders and the importance of recognizing these illnesses and being able to treat their symptoms are of highest relevance to the whole health care system, including physiotherapy.

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First I wish to thank my supervisor PhDr. Daniela Stackeová, Ph.D. for her cooperation and excellent advice. I should also like to thank Petter for his patience and encouragement, together with the rest of my family for their guidance and support.

Last but not least, a great thank to all of my professors during my five years at Charles University, for superb teaching and follow-up.

To Mamma

"I`ll stay in the sunny side of the valley"

Jeg savner deg!

LIST OF ABBREVIATION

AR applied relaxation

AT Alexander technique

BAS body awareness scale

BAT body awareness therapy

BDZ benzodiazepines

CBF cerebral blood flow

CBT cognitive behavior therapy

CNS central nervous system

CO2 carbon dioxide

COPD chronic obstructive pulmonary disorder

CPRS comprehensive psychopathological rating scale

DSM diagnostic and statistical manual of mental disorder

-TR text revision

GABA gama-amino-butyric acid

GAD generalized anxiety disorder

GADS generalized anxiety disorder scale

GP general practitioner

ICD international classification of disease

MBSR mindfulness based stress reduction program

NPP Norwegian psychomotoric physiotherapy

PAG periaqueductal gray

PD panic disorder

PCO2 arterial carbon dioxide tension

PT physiotherapy

RR relaxation response

TENS transcutaneous electrical nerve stimulation

TFT thought field therapy

WHO world health organization

CONTENTS

1. GENERALIZED ANXIETY AND PANIC DISORDER

1.1 Introduction to the problematic of anxiety

The term anxiety derives from the ancient concept “angh”, which means to “tighten” or “to make tight”. A long time ago the word was actually used to explain a laced up throat. Anxiety may increase respiration to become so fast and deep that the person involved gets the feeling of being suffocated [Berge et al., 2009].

Anxiety is a basic emotion, it is inborn, and has a great influence on the development and survival of the individual. Anxiety has also had a significant role for the survival of the mankind. The source in anxiety is an immediately psycho-physiologic reaction to danger, which involves, the preparation of fight or flight of the individual. Both in the development history of the individual and mankind, anxiety reactions towards small closed rooms, heights, insects, and strangers are more to the purpose, as alarm bells, when the person is too far from home and find them self alone and unprotected in an open land, they serve as protection throughout history [Nyboe et al., 2009; Berge et al., 2009; Gullberg, 1999; Wells, 2008].

Almost everybody is familiar with anxiety reactions, no matter if these reactions are felt as fear, nervousness, worry, shock or panic. It is also well known that anxiety reactions are recognized by certain somatic responses such as palpitations, perspiration, shivering, breathing alterations, and dizziness, and the attention is drawn to the danger itself. The psychic and somatic malaise contributes to immediate action of the person involved, typical by escaping from the dangerous situation. This explains how, by itself, anxiety is a condition which includes several different constituent. Researches divide anxiety into three equally important components. It involves:

- Somatic response
- Actions that are made
- The experience

The anxiety experience is first of all recognized as a feeling of danger or catastrophe. A panic attack is experienced as very dramatic. A person explained this as having a red warning-light in the head, with screaming sirens and voices that yell "danger, danger!" [Nyboe et al., 2009; Berge et al., 2009; Gullberg, 1999]

The expression "only a fool does not fear the ocean" explains the usefulness of anxiety. However there is a sliding transition from normal, to the purpose anxiety, fear and nervousness to the exaggerated and pathological types of worry. Mild anxiety may be a signal of struggles at work or troubles in marriage, but when the anxiety becomes as extensive as to become a suffering or decrease ability to work in society or function in everyday life it is classified as an anxiety disorder. [Berge et al., 2009; Ramsdal, 2009]

1.2 The difference between fear and anxiety

The words fear and anxiety are used inter changeable and I will continue to do use them in that manner throughout this thesis. However, there exists a certain distinction in these terms in colloquial speech [Berge et al., 2009]. Anticipation of and preparation for future harm are central features of fear and anxiety. These defensive responses adaptively organize behavior to deal with threats that endanger the integrity of the organism [Grillon, 2008]. Understanding the nature of fear and anxiety provides a framework for interpreting neural responses to threat. This is of clinical relevance because fear and anxiety may represent different aspects of anxiety disorders. Specific phobia involves abnormal phasic responses to specific threat cues, whereas in panic disorders, generalized anxiety disorder, and depression, anxiety is more sustained and less linked to a specific cue [Hasler et al., 2007]. When danger is concrete and tangible, as when a car comes straight towards one in high speed, it is explained as fear. If the danger is more diffuse, and involves a possible or future threat, it is described as anxiety, since the threat is expected to be uncontrolled and unknown. Fear can be interpret as an alarm-reaction which develops when the threat is present. The researches David Barlow and Michelle Craske have suggested that the difference between fear and anxiety is precisely to do with the distance to the danger. Fear develops when the danger is near, and when the reaction result in reflexive action as to flight or to fight against the threat or aimed at reducing the impact of the threat, for example by decreasing pain sensitivity when action is thwarted. Anxiety is related to situations where the incoming stimuli are interpret as potentially threatening. In a condition of anxious expectations the body is prepared to react on the

shortest notice, which consequently means that anxious people live in a constant hypervigiliant, sympathetic state. [Grillon, 2008; Berge et al., 2009; Pasienthåndboka, 2009] Fear involves a significant energy mobilization in an acute dangerous situation. This alarm-reaction may happen almost automatically, before the ability to think. On the other hand anxiety presupposes that the mind thinks through what the possible danger is. One who suffers from anxiety is often bothered by anxiety of the alarm-reaction- the fear has become a threat in itself. [Berge et al., 2009]

Many people have meant that the ability of humans to adapt and make plans for the future depends on the ability to feel anxiety. The philosopher Søren Kirkegaard meant that anxiety was the nobility-mark on the humanity: Our ability to think makes us also anxious. [Berge et al., 2009]

1.3 Demographics

In the general population, anxiety disorders are frequent with a lifetime risk up to 25 % to achieve one or several anxiety disorders [Nyboe et al., 2009]. Other authors suggest a lifetime prevalence of anxiety ranging from 13,6% to 28,8% [Pasquini et al., 2009; Thoeringer et al., 2008]. The World Health Organization study on psychological problems in general health care demonstrated a 10.1% prevalence rate for anxiety disorders. The most common forms are panic disorder, with or without agoraphobia, and generalized anxiety disorder [Boeijen et al., 2005]. Statistics for specific types of anxiety disorders are discussed individually, but it is estimated that up to 19 million people in the United States have some type of anxiety [Werner, 2005]. The prevalence in Norway is 3-5% of all patient contacts for generalized medical doctors [Pasienthåndboka, 2007]. Many anxiety disorders are more common in women than in men, but men are more likely to seek treatment for disorders that make it hard to function in public settings. These disorders take a huge toll on a person`s ability to complete school or hold a job. Consequently, a disproportionately high percentage of people with anxiety disorders never earn a high school diploma and are in the lowest end of socioeconomic ranking [Werner, 2005]. Disposition for anxiety exists in almost all people, and anxiety symptoms can be detected by several measurements, but there exist also the possibility to have several anxiety symptoms without having one set anxiety disorder. Hence there must be several “dark numbers” reading prevalence of anxiety. [Bunkan, 2008]

1.4 Symptoms and classification

Dozens of distinct anxiety disorders have been documented, each with a specific list of criteria for diagnosis [Werner, 2005; Shelton, 2004]. However related to all anxiety conditions there exists a group of general symptoms, which reflects the activity of the autonomic nervous system and other physical symptoms [Nyboe et al., 2009; Norsk legemiddelhåndbok, 2004].

It involves:

- Autonomic symptoms
  - Palpitations or fast pulse
  - Perspiration
  - Shivering
  - Mouth dryness
  - Hyper-urination
  - Diarrhea
  - Paresthesia
- Symptoms from chest and abdominal area
  - Short of breath feeling/ Dyspnea
  - Suffocation sensation
  - Pressure or pain in chest
  - Nausea or unease in stomach
- Psychic symptoms

    - Dizziness or woozy feeling
    - Insubstantial feeling
    - Fear of becoming insane
    - Anxiety of death
    - Hypervigilant state
    - Decreased libido
- General symptoms
    - Heat or cold sensation
    - Sensation of death or sleepiness
- Tension symptoms
    - Muscle tension or pain
    - Restlessness, difficulties to relax
    - Psychic tension sensation
    - Sensation of dysphagia
- Unspecific symptoms
    - Increased alertness
    - Concentration difficulties
    - Irritability
    - Insomnia [Nyboe et al., 2009; Pasienthåndboka, 2007; Bunkan, 2008]

In addition, there exist some specific symptoms which make it possible to subdivide the different disorders of anxiety into different types. In the 10. Edition of World Health Organization International classification of diseases (ICD-10) these disorders are placed in

chapter F40-48: Neurotic, Stress-related and somatoform disorders [WHO, 2009; Nyboe et al., 2009; Gullberg, 1999]

- **F40 Phobic anxiety disorders**
  - F40.0 Agoraphobia
    - .00 Without panic disorder
    - .01 With panic disorder
  - F40.1 Social phobias
  - F40.2 Specific (isolated) phobias
  - F40.8 Other phobic anxiety disorders
  - F40.9 Phobic anxiety disorder, unspecified
- **F41 Other anxiety disorders**
  - F41.0 Panic disorder (episodic paroxysmal anxiety)
  - F41.1 Generalized anxiety disorder
  - F41.2 Mixed anxiety and depressive disorders
  - F41.8 Other specified anxiety disorders
  - F41.9 Anxiety disorder, unspecified
- **F42 Obsessive – compulsive disorder**
  - F42.0 Predominantly obsessional thoughts or ruminations
  - F42.1 Predominantly compulsive acts (obsessional rituals)
  - F42.2 Mixed obsessional thoughts and acts
  - F42.8 Other obsessive – compulsive disorders
  - F42.9 Obsessive – compulsive disorder, unspecified

- **F43 Reaction to severe stress and adjustment disorders**
    - F43.0 Acute stress reaction
    - F43.1 Post-traumatic stress disorder
    - F43.2 Adjustment disorders
        - .20 Brief depressive reaction
        - .21 Prolonged depressive reaction
        - .22 Mixed anxiety and depressive reaction
        - .23 With predominant disturbance of other emotions
        - .24 With predominant disturbance of conduct
        - .25 With mixed disturbance of emotions and conduct
    - F43.8 Other reactions to severe stress
    - F43.9 Reaction to severe stress, unspecified [WHO, 2009] [Nyboe et al., 2009]

A phobia is an intense, irrational fear of something that poses little or no real danger. [Nyboe et al., 2009] [Werner, 2005]

The WHO`s ICD encircle about 145 countries all over, however there are many researches and American psychiatrics who use another system by the American Psychiatric Association. It is the DSM (diagnostic and statistical manual of mental disorders), and the current manual DSM-IV was last published in 1994, although in July 2000 an revised text edition was published and named DSM-IV-TR [American Psychiatric Association, 2009]. The DSM-IV-TR classifies anxiety disorders (as a category) as:

Axis I: Clinical Syndromes

Code: Disorder:

- 293.89 Anxiety disorder due to medical condition
- 300 Anxiety disorder, NOS

- 300.01 Panic disorder without agoraphobia

- 300.02 Generalized anxiety disorder

- 300.21 Panic disorder with agoraphobia

- 300.22 Agoraphobia without history of panic disorder

- 300.23 Social phobia

- 300.3 Obsessive compulsive disorder

- 308.3 Acute stress disorder

- 309.81 Posttraumatic stress disorder [AllPsych, 2004]

Both of these systems, ICD and DSM are not theoretical meaning that they do not serve as a explanation of perception of disease, but they describe an disease. This is called descriptive classification [Gullberg, 1999]

1.5 Etiology

Each type of anxiety disorder has its own etiology, but some group generalizations can be made. These disorders involve neurotransmitter imbalance in the brain, although which parts of the brain vary by individual problem [Werner, 2005]. There is growing evidence that brain areas involved in the stress response, including the prefrontal cortex, hippocampus and amygdala, play a role in the symptoms of anxiety. In the past few years, brain imaging studies have been dedicated to the progress of understanding of the neural circuitry of anxiety disorders [Engel et al., 2008]. The areas most frequently affected are parts of the limbic system: the area of the brain that stores memory and compares it to current experience to gauge an appropriate sympathetic or parasympathetic response. Other parts of the brain frequently affected are the basal ganglia (the site that initiates much muscular activity) and the frontal lobes (the area associated with judgment and decision-making). Some types of anxiety disorders can always be linked to a specific trigger. A genetic link appears to be a factor in some types of anxiety disorders, but the specific genetic mutation has not been found. This blend of genetics, life-changing events, and neurotransmitter imbalances produces emotions

and behaviors that can completely deliberate a person, making it impossible to go to school, to maintain relationships, or to hold a job. [Werner, 2005; Pasienthåndboka, 2007]

The pathophysiology of anxiety disorders may be understood within the frames of the biopsychosocial model. Different factors contribute to the development of predisposition of anxiety disorder and its progression. The first factor is the biological one- either a genetic link or medical conditions can contribute as a reason for developing general biological vulnerability. The second is the psychological factor- where the reason can be the experience of a loss, accidents, or lack of control over significant circumstances in life during development, or other relationships that involves stability and dependence. The third factor is the social one, and this is determining in what type of outcome the disorder get, with other words, the type of anxiety disorder the person will develop. These three factors compose the person's vulnerability. If the person it later exposed to stress, it may develop so called "false alarms" which includes panic attacks, or the latent vulnerability may break through and lead to the appearance of an anxiety disorder. [Nyboe et al., 2009; Pasquini et al., 2009; Ulvik et al., 2001] (Fig. 1.1)

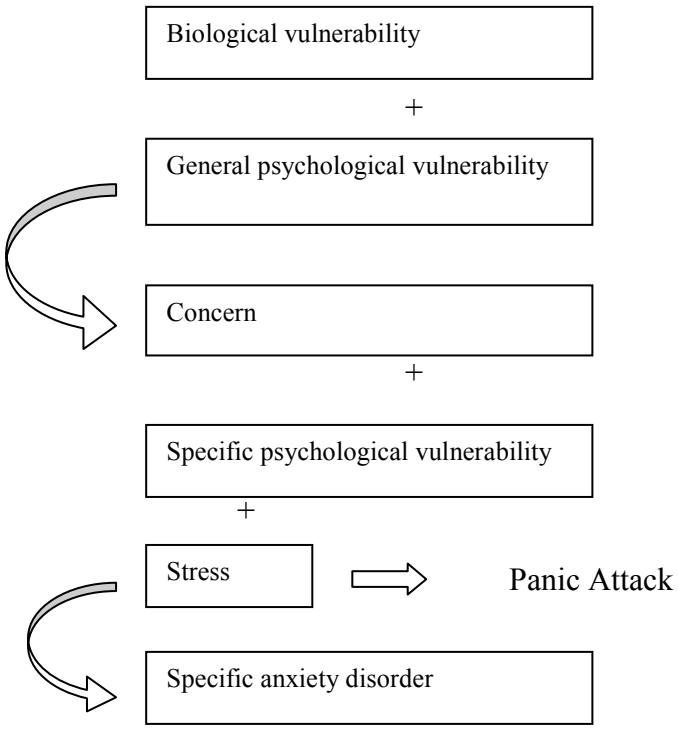

Fig. 1.1 The three divided vulnerability stress-model [Nyboe et al., 2009]

1.5.1 Biological theories of anxiety

1.5.1.1 Anxiety and the brain

During evolution of the human being neural systems are developed, which ensures the organisms ability to adjustments and survival. Specific parts of the brain are activated when the organism is faced with danger or to new stimuli from the surroundings and from the inner part of the body (e.g. lack of oxygen). It leads to a comprehensive biochemical-physiological activation, which increases the organism's readiness to the mentioned anxiety reactions (fight, flight, and freeze) [Nyboe et al., 2009]. It has became obvious that some areas involved in anxiety processing like the amygdala, distinct brainstem nuclei or the periaquaductal gray (PAG) are hard to detect with sufficient resolution because of their sizes and anatomical locations (closeness to structures of different density like bone or body liquids). Nevertheless, with increasing quality of methods, results become more and more precise and now allow for a consolidation of neuronal network hypotheses in anxiety disorders [Engel et al., 2008]. A simplified model can be seen in Figure 1.2.

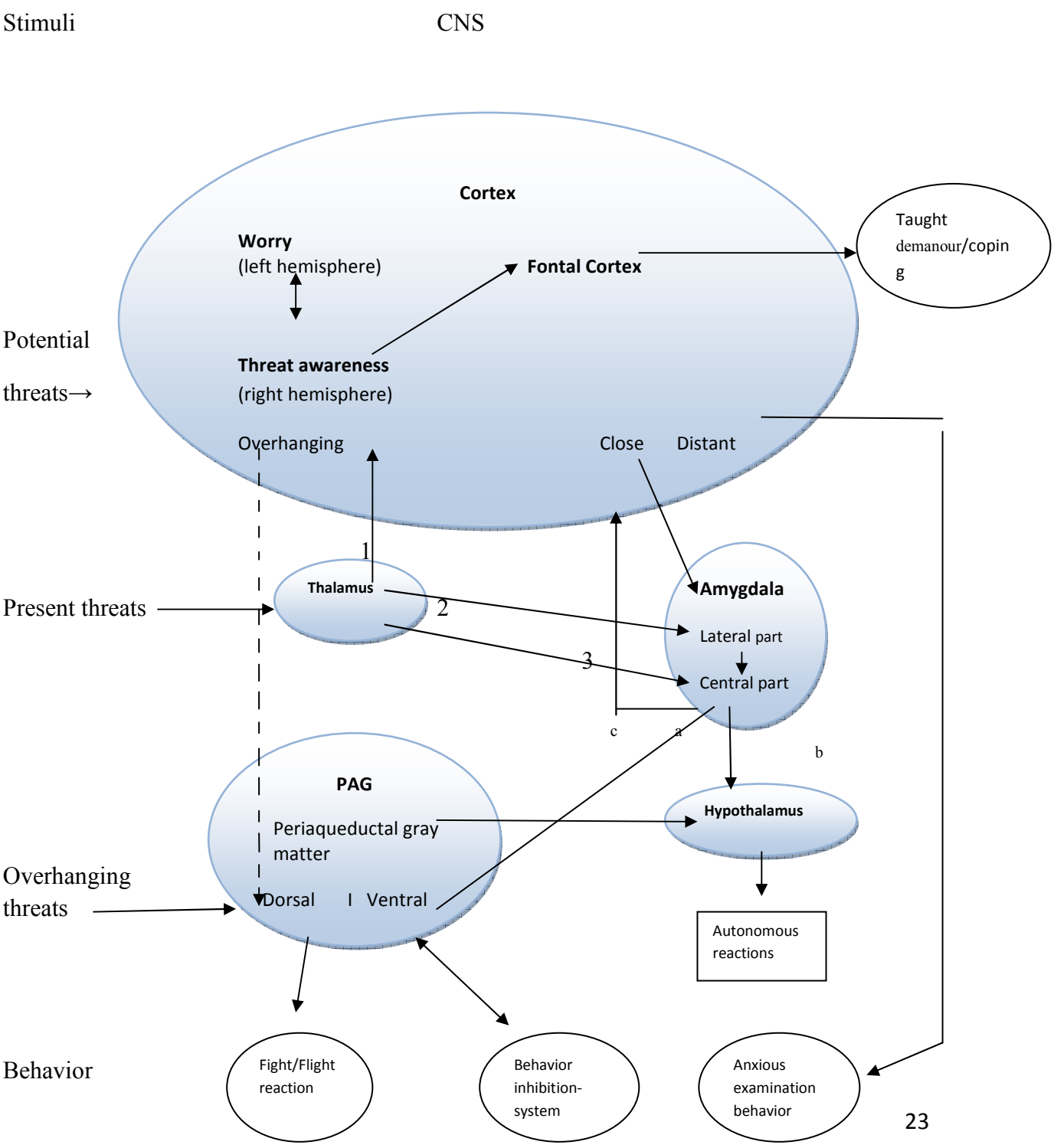
Stimuli
CNS
Cortex
Worry
(left hemisphere)
Fontal Cortex
Taught demanour/coping
Potential threats→
Threat awareness
(right hemisphere)
Overhanging
Close
Distant
1
Thalamus
2
3
Present threats
Amygdala
Lateral part
Central part
c
a
b
PAG
Periaqueductal gray matter
Dorsal I Ventral
Hypothalamus
Overhanging threats
Autonomous reactions
Behavior
Fight/Flight reaction
Behavior inhibition-system
Anxious examination behavior

Fig. 1.2 Neurophysiological anxiety model [Nyboe et al., 2009]

Worry appears to differ in from negative automatic negative thoughts and from obsessions. It can be defined as a chain of thoughts and images, negatively affect-laden and relatively uncontrollable [Wells, 2008].

By overhanging threats the deep, educationally old area of the brain, the PAG (a distinct cluster of neurons within the thalamus), are activated, and panic anxiety develops, which evokes the classic fight/flight reactions together with an inhibition of non-relevant behavior. There occurs also an activation of the region at the base of the forebrain (hypothalamus), and through it activation in the autonomic brain system, which again activates the inner organs (heart, lungs, stomach, and colon etc.). From here, arise many of the general symptoms which already have been explained (see 1.4). By present threats there is an immediate activation of the amygdala (primary modulator of the response to fear- or anxiety-inducing symptoms), which is a part of the limbic system, also an older part of the brain. It scans the potential threat quickly and thoroughly and creates emotional memories. The amygdala receives input from neurons in the cortex, through the thalamus, which has a central part in the interpretation of sense impressions from the surroundings. There exists a direct pathway from the thalamus to the central part of amygdala, which activates especially on many inborn anxiety-stimuli (e.g. small, closed rooms and heights) causing autonomic hyperactivity, that can be correlated with the physical symptoms of anxiety. There is evidence that patients with anxiety have a lowered threshold for amygdala activation during the presentation of fearful stimuli than non-anxiety people. Several human imaging studies have shown that activation of prefrontal cortex inhibits the activation of the amygdala. Potential threats entail a tendency to be concerned and estimate possible future reactions to danger. It involves a cognitive processing, which is elaborated in the cerebrum, where it is highly developed in human beings. The processes also play a great role of the ability to encounter stress and burdens. [Garakani et al., 2007; Nyboe et al., 2009; Goldberg, 2003; Shelton, 2004; Ressler et al., 2007]

1.5.1.2 Physiological basis of anxiety

A list of the physiological basis of anxiety can be made according to the biological theories of anxiety:

I. Genetic link
II. Sympathetic hyperactivity- with vegetative reactions
III. Hyperactivity of locus coeruleus center of nonadrenergic neurons
IV. Decrease in GABA (Gama-amino-butyric acid/ hyperactivity of CNS)
V. Increase in serotonin and dopaminergic system

[Shelton, 2004] [Wee et al., 2008]

I. Genetic link

In the same way that behavioral traits are passed from parents to child, anxiety disorders tend to run thorough family structures. It is however of a less genetic disposition than other psychiatric disorders e.g. schizophrenia. Studies comparing the risk of psychiatric illness in identical twins have found that in general, if one identical twin has a psychiatric condition, the risk that the other twin will have the same condition is approximately 50%. It therefore appears that nongenetic factors, including environmental influences occurring throughout the lifespan, must also contribute to the risk of developing an anxiety disorder [Shelton, 2004; Nyboe et al., 2009] The influence of genetics on panic disorder has also been studied. It has been suggested that CO2 sensitivity reflects a trait marker that runs in families. Hence, CO2 sensitivity can be considered a phenotypic expression of an underlying genetic predisposition that can exist before the clinical onset of panic disorder. The proposed genetic mechanisms include differential expression of chemoreceptors and its influence on neurotransmitter systems [Sardinha et al., 2009].

II. Sympathetic hyperactivity- with vegetative reactions

The autonomic nervous system helps to regulate the activities of cardiac muscles, smooth muscles, and glands, and through this regulation it is responsible for the somatic symptoms of anxiety. In this regulation, impulses are conducted from the CNS by an axon that synapses with a second autonomic neuron. It is the axon of this second neuron in the pathway that innervates the involuntary effectors.

The first of these neurons has its cell body in the grey matter of the brain or spinal cord and is called a preganglionic neuron. The second neuron, called a postganglionic neuron, has an axon that extends from the autonomic ganglion, (a ganglion is a collection of cell bodies outside the CNS), to an effector organ, where it synapses with its target tissue. Preganglionic autonomic fibers originate in the midbrain and hindbrain and in the upper thoracic to the fourth sacral levels of the spinal cord. Autonomic ganglia are located in the head, neck, and abdomen; chains of autonomic ganglia also parallel to right and left sides of the spinal cord. The origin of the preganglionic fibers and the location of the autonomic ganglia help to distinguish the sympathetic and parasympathetic divisions of the autonomic system. Sympathetic and parasympathetic axons often innervate the same target cells, where they release different neurotransmitters that promote different (and usually antagonistic effects). The sympathetic division is also called the thoracolumbar division because its preganglionic fibers exit the spinal cord from the first thoracic (T1) to the second lumbar levels (L2) and it activates the body to “fight or flight”, largely through the release of norepinephrine from postganglionic fibers and the secretion of epinephrine from the adrenal medulla. The first two columns in table 1.1 will reveal how each organ responds to sympathetic nerve stimulation during the fight-or flight response [Fox, 2004; Goldberg, 2003].

Effector Organ	Sympathetic Effect	Parasympathetic Effect
Eye		
Iris (radial muscle)	Dilation (pupil)	—
Iris (sphincter muscle)	—	Constriction (pupil)
Ciliary muscle	Relaxation (for far vision)	Contraction (for near vision)
Glands		
Lacrimal (tear)	—	Stimulation of secretion
Sweat	Stimulation of secretion	—
Salivary	Decreased secretion; saliva becomes thick	Increased secretion; saliva becomes thin
Stomach	—	Stimulation of secretion
Intestine	—	Stimulation of secretion
Adrenal medulla	Stimulation of hormone secretion	—
Heart		
Rate	Increased	Decreased
Contraction	Increased rate	Decreased rate
Strength	Increased	—
Blood Vessels	Mostly constriction (effects all organs)	Dilation in a few organs (e.g., penis)
Lungs		
Bronchioles (tubes)	Dilation	Constriction
Mucous glands	Inhibition of secretion	Stimulation of secretion
Gastrointestinal Tract		
Motility	Inhibition of movement	Stimulation of movement
Sphincters	Closing stimulated	Closing inhibited
Liver	Stimulation of glycogen hydrolysis	—
Adipose (Fat) Cells	Stimulation of fat hydrolysis	—
Pancreas	Inhibition of exocrine secretion	Stimulation of exocrine secretion
Spleen	Contraction	—
Urinary Bladder	Muscle constricted	Contraction
Arrector Pili Muscles	Erection of hair and goose bumps	—
Uterus	Pregnant: contraction; if not pregnant: relaxation	—
Penis	Ejaculation	Erection (due to vasodilation)

Tab. 1.1 Effects of autonomic nerve stimulation on various effector organs. [Fox, 2004]

The sympathetic nervous system is activated by any stimulus over an individual`s threshold (and the threshold can vary enormously), including feelings, and by noise, light, drugs and chemicals (e.g. caffeine). In response to the stimulus an immediate anticipatory state is generated by the release of epinephrine through the master of the autonomic system hypothalamus. [Caroll, 2001; Goldberg, 2003]

III. Hyperactivity of locus coeruleus center of nonadrenergic neurons

The locus coeruleus is a norepinephrine-containing brain stem nucleus that lies near the mesencephalic nucleus of CN5 (cranial nerve) [Goldberg, 2003]. Glucocorticoids activate the locus coeruleus, which send a powerfully activating projection back to the amygdala using the neurotransmitter norepinephrine. The amygdala then sends out more corticotrophin-releasing factor , which in turn, stimulates the release of corticotrophin, leading to release of the stress hormones, glucocorticoids and epinephrine from the adrenal cortex, and a vicious circle of feedback between the mind and the body results. Prolonged exposure of the CNS to glucocorticoid hormones eventually depletes norepinephrine levels in the locus coeruleus. As

norepinephrine is an important neurotransmitter involved in attention, vigilance, motivation, and activity, the onset of depression may subsequently occur [Garakani et al., 2007; Shelton, 2004]

IV. Decrease in GABA (Gama-amino-butyric acid/ hyperactivity of CNS)

Levels of GABA, the primary inhibitory neurotransmitter in the CNS, appear to be decreased in the cortex of patients with panic disorders (PD). Several studies have demonstrated that patients with PD have a dysfunction of the GABA-A receptors or altered brain GABA concentrations (or both) [Thoeringer et al., 2008]. By decreased action of GABA, the neuronal circuits in the limbic system increases, this leads to stimuli of the autonomic system [Goldberg, 2003].

V. Increase in serotonin and dopaminergic system

Physiological functions attributed to serotonin, a neurotransmitter by neurons that are located in the midline of the brain stem, include a role in the regulation of mood and behavior, appetite, and cerebral circulation. The serotonin secreted at the spinal cord has the ability to suppress pain, whereas the released serotonin in the diencephalon and cerebrum almost certainly plays an essential inhibitory role to help cause normal sleep. Neurons that use dopamine as a neurotransmitter are called dopaminergic neurons. The cell bodies of dopaminergic neurons are highly concentrated in the midbrain, and their axons project to different parts of the brain and their function involve two systems: motor control and emotional behavior [Fox, 2004; Guyton et al., 2000]. Studies by van der Wee et al., provided direct evidence for abnormalities in both the dopaminergic and the serotonergic systems in patients with generalized social anxiety disorder [van der Wee et al., 2008].

1.5.2 Psychological factor

The individual is determined by inheritance and environment. The inheritance is modified through external influence throughout the entire life. External factors are mainly relationships to other human beings, social interactions, geographic and ecological relationships. The interactions between these factors are responsible for a great part of the development of personality. The way the individual relates to its own feelings and experiences plays a great role in development of somatic and psychic disorders. Disturbance in body image and body awareness are good examples that leads to anxiety. [Bunkan, 2008]

1.5.3 Contributory cause

The development of the anxiety disorder is clearly related to the individual specific environmental relationships:

- Genetic factor
- Vulnerability in case of neurotic disorder
- Anxiety in parents
- Support from environment in psychic avoidance behavior
- Transmission of what represents danger and how it should be encountered
- Traumatic experiences [Dahl et al.; Wells, 2008]
- Substance abuse, e.g. high doses of caffeine produces an anxiety state [Lader et al., 1986]

From the parents it is clear that especially three conditions that are of great significance; first condition; the encouragement to and support of psychic avoidance behavior, so that the child is encouraged not to think of the things that are dangerous, to avoid frightening images and somatic anxiety symptoms. Secondly; the ability to clarify what danger is and how it can be encountered. The third condition is negative experience in the environment such as violence, and assault, and the degree of control related to those threats. The influence of a parent who modeled the use of worry as a means of dealing with problems, can contribute to children using worry to deal with real or imagined problems in life. [Dahl et al.; Wells, 2008]

1.6 Generalized Anxiety Disorder (GAD)

1.6.1 Prevalence

This disorder affects some 4 million people in the United States of America, which equals a prevalence rate of approximately 1 in 68 [cureresearch.com, 2003; Werner, 2005]. About 18 thousand people or 5 % in the Czech Republic and 1-2 % of the Norwegian population are

affected by GAD [[Vagnerova, 2004; Dahl et al.; cureresearch.com, 2003; Pasienthåndboka, 2007]. The lifetime prevalence of GAD is 5% internationally [Pasienthåndboka, 2007; Dahl et al.; Wells, 2008]. Women with GAD outnumber men by approximately two to one [Werner, 2005; Pasienthåndboka, 2007; Vagnerova, 2004], or according Professor Dahl the disorder is three times more common in women than in men [Dahl et al.]. In addition there seem to be an association between GAD and being middle aged, unmarried and having a low income. The disorder often develops around the age of 20, but may also occur in all ages, especially common in elderly who live in nursing homes, as well as in older with reduced mobility [Pasienthåndboka, 2007; Coe, 2003]. There are some uncertainties by determining how common GAD is, when about 50% of people who suffer from anxiety do not seek any medical help. About 2/3 of the people with GAD suffer from another mental illness at the same time, and about 9 out of 10 will obtain another mental illness during life. (Most often depression, phobia or panic disorder) [Pasienthåndboka, 2007].

1.6.2 Diagnostic criteria

Many patients who seek a medical doctor are worried and tense for more or less a good reason. Generalized anxiety disorder is different in a way that their worries are out of control and that the combination with tension symptoms leads to a strong discomfort or function failure [Dahl et al.]. The central diagnostically feature with GAD, in addition to the general symptoms is according to DSM-IV: excessive anxiety and worry occurring more days than not for a minimum of six months about a number of events. The person should fin the worry difficult to control, and should report at least three of the following symptoms:

- Restlessness or feeling keyed up and on edge
- Easily fatigued
- Difficulty concentrating or mind going blank
- Irritability
- Muscle tension
- Sleep disturbance (difficulty falling asleep, staying asleep, or restless unsatisfying sleep)

The focus of anxiety and worry should not be confined to another Axis I disorder (e.g. worry is not about being embarrassed in public as in social phobia). The anxiety and worry should cause significant distress or impairment in functioning, and the disturbance should not be due to substance effects such as drug use or medical conditions such as hyperthyroidism, or occur only during a mood disorder or psychotic disorder.

Individuals with GAD report feeling anxious or apprehensive most of the time; this may be characterized by a general inability to relax or more specific symptoms such as muscle tiredness, feeling on the edge, clammy or cold hands, dry mouth, diarrhea, urinary frequency, sweating and nausea. The worry component of the problem may be more or less marked at initial presentation. However, problematic worry is a key feature of the disorder. [Nyboe et al., 2009; Dahl et al.; Pasienthåndboka, 2007; Wells, 2008; Shelton, 2004]

The diagnostic criteria of GAD according the ICD-10 are:
Note: for children different criteria may be applied

A. A period of at least six months with prominent tension, worry and feelings of apprehension, about every-day events and problems.
B. At least four symptoms out of the following list of items must be present, of which at least one from items (1) to (4).

Autonomic arousal symptoms

(1) Palpitations or pounding heart, or accelerated heart rate
(2) Sweating
(3) Trembling or shaking
(4) Dry mouth (not due to medication or dehydration

Symptoms concerning chest and abdomen

(5) Difficulty breathing
(6) Felling of choking
(7) Chest pain or discomfort
(8) Nausea or abdominal distress (e.g. churning in stomach)

Symptoms concerning brain and mind

(9) Feeling of dizzy, unsteady, faint or light-headed
(10) Feeling that objects are unreal (derealization), or that one`s self is distant or "not really here" (depersonalization)
(11) Fear of losing control, going crazy or passing out

(12) Fear of dying

General symptoms

(13) Hot flushes or cold chills

(14) Numbness or tingling sensation

Symptoms of tension

(15) Muscle tension or aches or pain

(16) Restlessness and inability to relax

(17) Feeling keyed up, or on edge, or of mental tension

(18) A sensation of a lump in the throat, or difficulty with swallowing

Other non-specific symptoms

(19) Exaggerated response to minor surprises or being startled

(20) Difficulty in concentration, or mind going blank, because of worrying or anxiety

(21) Persistent irritability

(22) Difficulty getting to sleep because of worrying

C. The disorder does not meet the criteria for panic disorder (F41.0), phobic anxiety disorders (F40.), obsessive-compulsive disorder (F42) or hypochondriacal disorder (F45.2.)

D. Most commonly used exclusion criteria: not sustained by a physical disorder, such as hyperthyroidism, an organic mental disorder (F0) or psychoactive substance-related disorder (F1), such as excess consumption of amphetamine-like substances, or withdrawal from benzodiazepines. [WHO, 1993; WHO 2009]

Generalized anxiety disorder of childhood according ICD-10:

A. A period of at least one month with recurrence of excessive, disproportionate and intrusive anxieties or worries, as indicated by at least three of the following:
   (1) Excessive concerns about the quality of one`s performance in areas such as schoolwork, sports, and other regular activities.
   (2) Excessive concerns about a physical health (despite an evident good health, or, if hurt or sick, concerns that go beyond a normal apprehension) or about being injured.
   (3) Excessive concerns or anticipatory worries in relation to particular non-health themes (money or financial well-being, punctuality, appearance, catastrophes, disasters, etc.).

(4) Free floating anxiety unrelated to specific situations.
(5) A frequent need for reassurance that persists in spite of several appropriate attempts to reassure the child.
(6) Marked feelings of tension, inability to relax, or to concentrate, nervousness, difficulty getting to sleep, autonomic symptoms (such as palpitations, sweating, dry mouth, etc.).
(7) Recurrent somatic complaints, (headaches, stomachaches, etc.) for which no physical basis can be demonstrated.

B. The multiple anxieties or worries occur across at least two situations, activities, contexts or circumstances. GAD does not present a discrete paroxysmal episodes (as in panic disorder) or situations (as in social anxiety disorder or phobic disorder in childhood).
C. Onset in childhood or adolescence (below age 18).
D. The symptoms in A interfere daily in significant way with the child`s activities.
E. The disorder does not occur as part of a broader disturbance of emotions, conduct, personality, or of a pervasive developmental disorder, psychotic disorder or psychoactive substance use disorder. [WHO, 1993]

1.6.3 A cognitive model of GAD

It follows that if the content of normal and GAD worries is similar, a main distinguishing feature of GAD is the form that worry takes (more about illness, health, and injury issues) and the subjects` appraisal of the significance of worrying. On the basis of this assertion, it is possible to distinguish between two types of worry termed Type 1 and Type 2 worries. Type 1 worries concern external daily events such as the welfare of a partner and non-cognitive internal events such as concerns about bodily sensations. Type 2 worries in contrast are focused on the nature and occurrence of thoughts themselves- e.g. worrying that worry will lead to insanity. Type 2 worry is basically worry about worry.[Wells, 2008] The cognitive model of GAD asserts that abnormal varieties of worry such as that found in GAD are associated with high incidence if Type 2 worries, in which GAD patients negatively appraise the activity of worrying. [Wells, 2008]

Aside from negative beliefs the model asserts that GAD patients also have tacit positive beliefs about worrying, or the benefits of rumination as a coping strategy. The use of worry as a safety strategy is illustrated by a patient who constantly worried about being mugged when walking alone in the street because he believes that worrying offered a means of ´always being prepared´ to deal with such a problem. Unfortunately his preoccupation with being mugged and how he could deal with it heightened his sense of vulnerability as generated an increasing range of negative scenarios. His worrying is used as a coping strategy to protect him from more imitating imaginations and bodily reactions, because his thought of worries reduces these reactions. [Dahl et al.; Wells, 2008]

Many patients report that they have a long history of worrying. Once worry about worry has been established a number of additional factors are involved in the escalation and maintenance of the problem: (1) behavioral responses; (2) thought control attempts; (3) emotional symptoms. [Wells, 2008]

(1) Behavioral responses

Two types of behavior are important: avoidance, and reassurance seeking. On one level GAD patients is associated with avoidance of a range of situations. There may be avoidance of social events, avoidance of unpleasant news items, or more pervasive avoidance resembling agoraphobia (fear of leaving the house). In summary, avoidance may be as a means of preventing worry and the dangers associated with it as well as a means of avoiding external threat. Reassurance seeking is also evident in some cases of GAD, and is aimed at interrupting worry cycles or preventing the onset of chronic worry. Unfortunately it can be a counter-productive strategy for worry control, since it may lead to increased ambiguity concerning Type 1 threat. Having a partner telephone at regular intervals to say that he/she is safe, can temporarily prevent worry but this increases the propensity for worry if reassurance is not delivered on time. [Wells, 2008; Nyboe et al., 2009]

(2) Though control

Since people with GAD have positive as well as negative beliefs about their worries, worry may be practiced within strict limits or in special ways that are intended to exploit the benefits of worrying while, at the same time, avoiding the dangers. The effect of thought control or suppression attempts may be to increase the frequency of worry triggers, an outcome likely to

strengthen negative beliefs about thoughts such as beliefs about their uncontrollability. Some patients report the use of distraction to avoid worries. This may take several forms such as absorption with work or hobbies. Suppression strategies or attempts to control one`s worries are safety behaviors intended to avert the appraised dangers of worrying, and are thus associated with Type 2 worries. [Wells, 2008]

(3) Emotion

Type 1 worry can lead to initial increments in anxiety and tension, or decrements in anxiety if the goals of worrying are being met. However, with the activation of Type 2 worrying, anxiety escalates and emotional symptoms may be interpreted as evidence supporting Type 2 concerns. For example, symptoms of a racing mind, dissociation, and inability to relax may be viewed as evidence of loss of mental control. In some instances, where there are appraisals of immediate mental catastrophe, panic attacks may result. The model can account for the overlap between GAD and panic in this way. [Wells, 2008]

1.6.3.1 Verbal strategies for eliciting Type 2 worry

A range of strategies are available for eliciting Type 2 worry, these are : guided questioning; the advantages-disadvantages analysis; identifying control behaviors; experimental strategies; questionnaires.

A questionnaire assessment is a self-report instrument for assessing dimensions of worry. The generalized anxiety disorder scale (GADS) is a multi-component rating scale for measuring distress, positive and negative beliefs, behaviors, and control strategies considered important in the maintenance of GAD as predicted by Well`s cognitive model [Wells, 2008]. See appendix Figure 5.1.

1.6.4 Comorbidity

GAD patients, like many others, often present with multiple problems, as other anxiety disorders, depression, personality disorders and addiction disorders. In the National Comorbidity Survey, which used DSM-III-R diagnostic criteria, 66% of individuals met criteria for an additional current disorder and 90% met criteria for another disorder during their lifetime [Henning et al., 2007]. It is stated by Berg (2005) that anxiety and depression

interacts with each other, by being depressed the worrying increases and with anxiety over a sustained period of time, the mood will be affected in a decreasing manner [Søderlund, 2008]. Mental disorders are hierarchically arranged in DSM and ICD, however the evidence establishes that most disorders co-occur and are empirically related, but some disorders are more highly comorbid than others. The taxonomic structures to official diagnostic manuals need to reflect this fact. What this would mean form DSM-V/ICD-11, for example, is that instead of grouping GAD and panic disorder under the heading of anxiety disorder, GAD and overanxious disorder would be grouped with major depressive disorder , because they share more variance with these depressive disorders that with other anxiety disorders [Clark et al., 2006]. A high degree of comorbidity increases the differential diagnostic challenges, but it remains a question how important this is according to the therapy. In such cases treatment should be prioritized. The most important is to identify comorbid somatic sufferings which should be treated, personality disorders which results in decreased outcome of therapy and addiction disorders which needs a specified effort. It is clear that GAD is more common in somatic disorders like irritable bowel syndrome, ulcerative colitis, diabetes, and chronic fatigue syndrome [Dahl et al.; Wells, 2008]. Valenca et al. (2006) found a comorbid relation between asthma and anxiety; 43,5% of the patients with asthma met criteria for at least one psychiatric diagnosis, whereas 20,9% where GAD [Valenca et al., 2006]. Differential diagnosis includes withdrawal from drugs or alcohol, excessive caffeine consumption, depression, schizophrenia and organic causes such as thyrotoxicosis, parathyroid disease, hypoglycaemia, phaeochromocytoma, and carcinoid syndrome [Katona et al., 2008].

1.6.5 Prognosis and course

General anxiety disorder often begins before or during young adulthood and can be a lifelong problem. Spontaneous remission is rare [Gale et al., 2003]. GAD has unfortunately often a prolonged course and a small degree of remission when connected with co-morbidity. Only one out of three patients experience a sudden improvement, which indicates that any treatment should be active, and not based on “let`s see how it goes”. The prognosis is worse in women, and in people with personality disorders, abuse disorder, problematic marriage and family, and also in people with a co-morbid somatic disorder [Dahl et al.]. Individuals with

GAD report a lower quality of life especially with impairment at work, in social life and family/home responsibilities [Henning et al., 2007].

1.6.6 Treatment

Several lines of evidence suggest that there are specific neural circuits within the limbic-cortical system that mediate stress-responsiveness, mood and emotional regulation. Disorders of mood and anxiety represent brain-based disorders that lead to dysregulation of these circuits. Traditional psychiatric medication, psychotherapy and somatic therapies converge in bringing homeostasis to these disrupted circuits [Ressler et al., 2007]. The main goal of treatment is to decrease symptoms and teach the patient to encounter situations which is felt as anxiety promoting. Incriminating environmental factors should be identified, and the worry is met by empathy, respect and impartiality, to gain the confidence from the patient. The clinical picture of symptoms, and ability to cooperate creates a foundation upon short term treatment-plan is made. Continuity in the patient-therapist relationship is valuable. In non-complicated cases the main focus can be support and encouragement, and in more severe cases pharmacologic treatment is often needed in addition. The long-term treatment plan must be adjusted to the premises to the patient, occurrences in life, and the expected value of continued psychotherapy and/or medications. Some patients achieve good therapy results with progressive relaxation and meditation. [Statens helsetilsyn, 2000] Meditation can reduce arousal state and may ameliorate anxiety symptoms in various anxiety conditions [Vøllestad, 2007]. Physical training results in an incidentally reduction of anxiety levels and regular physical activity can be a useful coping strategy. [Statens helsetilsyn, 2000]

1.6.6.1 Psychotherapy

Support therapy: Regularly contact with a sympathetic and interested therapist, repeated insurance that the anxiety is not dangerous, removal or reduction of environmental burdens and support in anxiety inductive situations, leads normally to reduced anxiety. Although the patient is not cured, does the support therapy alone, or in combination with other methods lead to improvement of the patient's situation. [Statens Helsetilsyn, 2000]

Psychodynamic (analytic) psychotherapy: The primary focus is to reveal the unconscious content of a patient`s psyche to alleviate psychic tension. [Nyboe et al., 2009] It may be

indicated in exquisite cases; however the effect is not well studied by modern, criteria based diagnostics. [Statens Helsetilsyn, 2000]

Cognitive-behavioral therapy (CBT), and to some degree adjusted relaxation techniques, are specified methods which is recommended to motivated patients, primary to other types of therapy as it is cost-efficient and the long-term effect appears to be longer than medication therapy [Statens Helsetilsyn, 2000]. With methodic weakness and lack of comparative studies in mind, will CBT appear to be more efficient than behavioral therapy and psychodynamic therapy in GAD [Statens Helsetilsyn, 2000; Nyboe et al., 2009]. A study compared CBT with enhanced usual care in older adults and proved that CBT improves worry severity, depressive symptoms and general mental health state; however it did not improve the measure of severity of GAD [Stanley et al., 2009]. CBT is a type of treatment where patients learn to change their behaviors and beliefs in order to better cope with or alleviate a particular condition. Regardless of the age of the patient, the basic elements are the same. The components of CBT are:

- Relaxation training
- Exposure sessions where the patient experiences anxiety-provoking situations in a graduated, controlled way in order to habituate to the uncomfortable emotions and physical symptoms associated with anxiety.
- Cognitive restructuring, which includes new interpretations of the physical symptoms of anxiety and development of " replacement" thought for the constant worry.[Coe, 2003]

1.6.6.2 Pharmacological drug treatment

A well-known example of chemical substances anxiolytic effect is alcohol. Regular intake of alcohol to depress the anxiety is not recommended as it can lead to addiction [Nyboe et al., 2009]. Today there are several medications which have anxiolytic effects; I. Benzodiazepines II. Other anxiolytic drugs.

I. Benzodiazepines (BDZs) are the most widely used anxiolytic drugs. They have an anxiety depressing, muscle relaxant, sedative, hypnotic and spasmolytic effect [Norsk legemiddelhåndbok, 2004]. BDZs are frequently prescribed for insomnia

and anxiety in patients with chronic pain [Marazziti et al., 2006]. At low doses, the benzodiazepines are anxiolytic, by selectively enhancing GABAergic transmission in neurons, thereby inhibiting neuronal circuits in the limbic system of the brain [Howland et al., 2006]. BDZs are generally used in the acute treatment of GAD, preferentially in those patients affected by somatic symptoms, because of addiction potential [Pasquini et al., 2009; Howland et al., 2006]. The doses of BDZs are rapidly and completely absorbed after oral administration (effect within one hour) and have a large therapeutic index. The doses depend on gender, age, previous medications, nicotine and alcohol assumption [Statens helsetilsyn, 2000]. The duration of action of BDZs differ between long-acting (diazepam), intermediate-acting (alprazolam), and short-acting (oxazepam) [Howland et al., 2006]. By distributing the diazepam in the evening, the sedation and muscle relaxation effect gives a more effective sleep and decreased cognitive side effects at daytime. Oxazepam last in general 2-4 hours, which is preferable for patients who suffer from anxiety in the morning and elderly people with decreased medication trade [Statens helsetilsyn, 2000]. Adverse effects of BZDs;

- Drowsiness and confusion
- Ataxia (at high doses)
- Cognitive impairment (decreased long-term recall and acquisition of new knowledge)
- Rapid development of tolerance
- Nausea
- Euphoria
- Paradoxical aggression
- Dependency [Howland et al., 2006; Norsk legemiddelhåndbok, 2004; Harrison et al., 2005]

Benzodiazepines should be used cautiously in treating patients with liver disease, lunge disorders, muscle weakness, personality disorders and pregnancy. They should

be avoided in patients with acute narrow-angle glaucoma, serious liver diseases, myasthenia gravis, sleep apnea and respiratory depressions and insufficiencies. Alcohol and other CNS depressants enhance the sedative-hypnotic effect of the BZDs [Norsk legemiddelhåndbok, 2004; Howland et al., 2006].

II. Other anxiolytic drugs

- Buspirone is useful in the treatment of GAD, and has efficacy comparable to the BZDs. The anxiolytic effect (by being a serotonin-agonist, and to some degree it affects the dopamine receptors) is not accompanied by the sedative nor muscle relaxation effect as in the BZDs. Psychomotor and cognitive dysfunction are minimal, and dependence unlikely. Buspirone has the disadvantages of a slow onset, about 10-14 days, maximally four weeks. The frequency of adverse effects is low, the most common effects being headaches, dizziness, nervousness, and light-headedness [Howland et al., 2006; Norsk legemiddelhåndbok, 2004]. Other adverse effects are diarrhea, paresthesia, sleep disturbances, increased perspiration, tremor, tachycardia and allergic reactions. The risk of extra pyramidal adverse effects should not be excluded. Precautions with driving (since ability to react may be affected), should be made and avoidance to people who suffer from decreased liver function and/or marked decreased kidney function [Norsk legemiddelhåndbok, 2004].

- Hydroxyzine is an antihistamine with antiemetic activity. It has low tendency for habituation and, thus, is useful for patients with anxiety who have a history of drug abuse [Howland et al., 2006]. Drowsiness, nausea, mouth dryness is possible adverse effects [Norsk legemiddelhåndbok, 2004].

- Klometiazol, Zaleplon, Zolpidem and Eszopiclone are other types of anxiolytics and their most common adverse effects are: nightmares, agitation, headache, gastrointestinal upset, dizziness, dry mouth, chest pain, migraine, peripheral edema, unpleasant taste, hypotension and tachycardia [Howland et al., 2006; Norsk legemiddelhåndbok, 2004].

- Barbiturates have been used as mild sedatives to relieve anxiety, nervous tension, and insomnia due to their interaction with GABA receptors which enhance

GABAergic transmission. However, most barbiturates have been replaced by the benzodiazepines. Barbiturates cause adverse effects like drowsiness, vertigo, tremor, impaired concentration, mental and physical sluggishness, “drug hangover”, dependence and poisoning at overdoses [Howland et al., 2006].

- Antidepressant drugs like venlafaxine, which inhibit the re-uptake of both serotonin and norepinephrine [Howland et al., 2006; Whalen et al., 2008], are evidence based proven to decrease the symptoms of GAD [SBU, 2005]. The most common side effects of venlafaxine are nausea, dizziness, insomnia, sedation, and constipation. At high doses, there may be an increase in blood pressure [Howland et al., 2006].

1.6.6.3 Other types of treatment

Cognitive-behavioral therapy and some medications have evidence based treatment effect of GAD [SBU, 2005]. However, there exist other treatment options which are not evidence based:

- Thought Field Therapy (TFT), addresses specific problems fundamental causes, providing information in the form of a healing code, balancing the body`s energy and allowing elimination of most negative emotions, while promoting the body`s own healing ability. In treatment there is stimulation of so called acu-points by gently pounding them as thinking of the emotional problem. This method is used to treat anxiety, although there are no studies proving that TFT has therapeutic effect [Kjensli, 2009].

- Physical activity results in an incidentally reduction of anxiety levels and performed regularly it can be a useful coping strategy [Statens helsetilsyn, 2000].

There is some evidence of an anxiolytic effect with aerobic exercise, possible more beneficial than non-aerobic exercise [Kirkwood et al., 2005].

- Feldenkrais method have showed mental improvement with new established bodily awareness like; decreased stress experiences, reduced anxiety and improvement of feeling of managing [Aulid, 2008]

- Physiotherapy has as a goal to improve one`s contact with its own body. Through this awareness the patient will be able to learn to normalize increased unsuitable respiration and muscle tension in situations where the anxiety develops. This lead to improved coping of anxiety [Møller et al., 2001].

- Psychomotoric physiotherapy that focuses on the muscle tension and somatic pain related to the anxiety and increases the "access" to patient's emotions through psychoanalytic methods [Bunkan, 2001].

- Meditation and attention therapy can improve the patient's ability to be `present in the moment` and not to focus on future, possible threats as patients with GAD does [Vøllestad, 2007]

- A cyclical combination of yoga postures and supine rest in cyclic meditation improved memory scores immediately after the practice and decreased the state of anxiety [Subramanya et al., 2009].

- Relaxation techniques, breathing exercises, and biofeedback are often taught to anxiety disorder patients as coping mechanisms and it seems reasonable that massage and bodywork would fit under this heading as well [Werner, 2005].

- Acupressure through the Yan wei mai meridian decreases symptoms of anxiety [Algotsson, 2002].

- Naturopathic medicine (also known as naturopathy) is a school of medical philosophy and practice that seeks to improve health and treat disease chiefly by assisting the body's innate capacity to recover from illness and injury. This alternative medical system of care employs the use of many complementary and alternative medicine therapies including acupuncture, herbal medicine, osteopathy,

nutrition, homeopathy, and lifestyle counseling in a combined manner to address the underlying cause of disease and can lead to significant improvement of patients` anxiety [Cooley et al., 2009].

- A systematic review in people with anxiety disorders, including GAD, found that kava versus placebo significantly reduced symptoms of anxiety over four weeks [Gale et al., 2003].

1.7 Panic disorder

1.7.1 Prevalence

Panic disorder (PD) affects approximately 2.4 million Americans, with women outnumbering men by roughly two to one [Werner, 2005]. In the Czech Republic and Norway the prevalence is estimated to 2-4% of the general population and in the Czech Republic women outnumber men by two to one, while the prevalence in Norway is 40-60% more common in women [Vagnerova, 2004; Andreassen et al., 2009]. Panic disorder is common in the general population; around 1% has panic disorder, with a one-year prevalence of 2.7% and a lifetime prevalence of 4.7% [Katona et al., 2008; Pasquini et al., 2009; Marchesi, 2008]. If divided between genders, the lifetime prevalence in women is 3.5% and 2% in men. In about half of those cases agoraphobia occurs [Statens helsetilsyn, 2000]. The typical age at onset is 25-44 years, and may come and go for several years [Katona et al., 2008; Letnes, 2002].

1.7.2 Diagnostic criteria

According the DSM-IV panic attacks are defined as rapid occurrences of anxiety or rapid escalations in current anxiety in which there are at least 4 of 13 somatic or cognitive symptoms. Four or more symptoms have to escalate or occur within a ten-minute period, to meet panic criteria. These symptoms include physical responses such as palpitations, dizziness, sweating, choking, trembling or shaking, breathlessness, cold/hot flashes, paresthesia, depersonalization, and cognitive symptoms such as fear of dying, suffocating, going crazy, and so on [Marchesi, 2008; Pasienthåndboka, 2007; Wells, 2008]. In some instances fewer than four symptoms occur in an attack, and these are known as limited symptoms attacks but the distinction is somewhat arbitrary. Panics can also be differentiated

in a way that relates to the conditions under which they occur. More specifically, panics may be situational or spontaneous. Spontaneous panics occur unexpectedly, while situational panics occur in situations that almost always cause anxiety. In order for an individual to meet criteria for panic disorder in accordance with DSM-IV the presence of recurrent, unexpected panic attack followed by at least one month of persistent concern about having another panic attack or a significant behavioral change related to the attack is required [Wells, 2008]. In addition it is important to establish that organic factors are not maintaining the problem. Organic factors which should be ruled out include: caffeine, cocaine or amphetamine intoxication, other stimulating drugs or medicines containing caffeine or stimulants used in treating asthma, hyperthyroidism, angina, arrhythmia, heart attack and acute asthma attack. Panic attacks occur in disorders other than panic disorder; for example, a social phobic on exposure to the feared situation [Pasienthåndboka, 2007; Goodman et al., 2007; Wells, 2008].

Panic attacks can be nocturnal in which case an individual may wake from sleep in a state of intense anxiety. Panic commonly occurs in conjunction with agoraphobia, although not all agoraphobics have panic attacks or meet the criteria for panic disorder. Agoraphobic avoidance develops in cases of panic disorder when individuals avoid situations in which they fear they might have another panic attack. The avoidance can lead to a highly restricted lifestyle in more severe cases. Panic disorder with agoraphobia is diagnosed when the person meets diagnostic criteria for panic disorder is also agoraphobic. Agoraphobia is defined in DSM-IV as: `Anxiety about being in places or situations from which escape might be difficult (or embarrassing) or which help may not be available in the event of having an unexpected or situationally predisposed panic attack` [Wells, 2008].

The diagnostic criteria according the ICD-10 can be listed as:

F41.0 Panic disorder (episodic paroxysmal anxiety)

A. Recurrent panic attacks, that are not consistently associated with a specific situation or object, and often occurring spontaneously (e.g. the episodes are unpredictable). The panic attacks are not associated with marked exertion or with exposure to dangerous or life-threatening situations.

B. A panic attack is characterized by all of the following:

   (a) It is a discrete episode of intense fear or discomfort;

(b) It starts abruptly;

(c) It reaches a crescendo within a few minutes and lasts at least some minutes;

(d) At least four symptoms must be present from the list below, one of which must be from items (1) to (4):

Autonomic arousal symptoms

(1) Palpitations or pounding heart, or accelerated heart rate.

(2) Sweating.

(3) Trembling or shaking.

(4) Dry mouth (not due to medication or dehydration).

Symptoms concerning chest and abdomen

(5) Difficulty breathing.

(6) Feeling of choking.

(7) Chest pain or discomfort.

(8) Nausea or abdominal distress (e.g. churning in stomach).

Symptoms concerning brain and mind

(9) Feeling dizzy, unsteady, faint or light-headed.

(10) Feelings that objects are unreal (derealization), or that one`s self is distant or "not really here" (depersonalization).

(11) Fear of losing control, going crazy or passing out.

(12) Fear of dying.

General symptoms

(13) Hot flushes or cold chills.

(14) Numbness or tingling sensations.

C. Most commonly used exclusion criteria: not due to a physical disorder, organic mental disorder, or other mental disorders such as schizophrenia and related disorders, or somatoform disorders.

The range of individual variation of both content and severity is so great that two grades, moderate and severe, may be specified, if desired, with a fifth character.

F41.00 Panic disorder-moderate: at least four panic attacks in a four week period.

F41.01 Panic disorder-severe: at least four panic attacks per week over a four-week period [WHO, 1993; WHO, 2009].

Diagnostic criteria of agoraphobia according the ICD-10 can be listed as:

F40.0 Agoraphobia

A. Marked and consistently manifest fear in or avoidance of at least two of the following situations:

(1) Crowds;

(2) Public places;

(3) Travelling alone;

(4) Travelling away from home. [WHO, 1993]

The rest of the symptoms of anxiety are the same as for F41.0 B. from (d) (1)-(14). The presence of panic disorder (F41.0) may be specified by using a fifth character: F40.01 Agoraphobia with panic disorder. [WHO, 1993]

1.7.3 Cognitive model of panic disorder

There are several cognitive models of the development and maintenance of panic disorder and agoraphobia. The model of panic proposed by Clark (1986) is one of the most useful for the cognitive conceptualization and treatment of the disorder. The model proposes that a certain sequence of events leads to panic attacks. This sequence is circular and the model has

become known as the `vicious circle model` of panic. In Clark`s model, panic attacks result from the catastrophic misinterpretation of bodily or mental events. These events are misinterpreted as a sign of an immediate impending disaster, such as the sign of having a heart attack, of collapsing, suffocating, or going crazy. For example, physical sensations such as dizziness may be interpreted as a sign of fainting, and speeded heart rate as a sign of a heart attack. Mental events such as difficulty concentrating or the experience of racing thoughts can also be misinterpreted, often as a sign of a mental or social catastrophe such as losing control of one`s mind or behavior. According to the model the sensations that are misinterpreted are mainly those associated with anxiety, but other non-anxiety sensations may also be misinterpreted. Non-anxiety sensations include feelings of shakiness or lightheadedness caused by low blood sugar, the sensation associated with postural changes in blood pressure, effects of alcohol withdrawal, tiredness, and so on. Many normal bodily sensations or deviations in physiological activity can become the target of misinterpretation [Wells, 2008]. The basic model is presented in Figure 1.5.

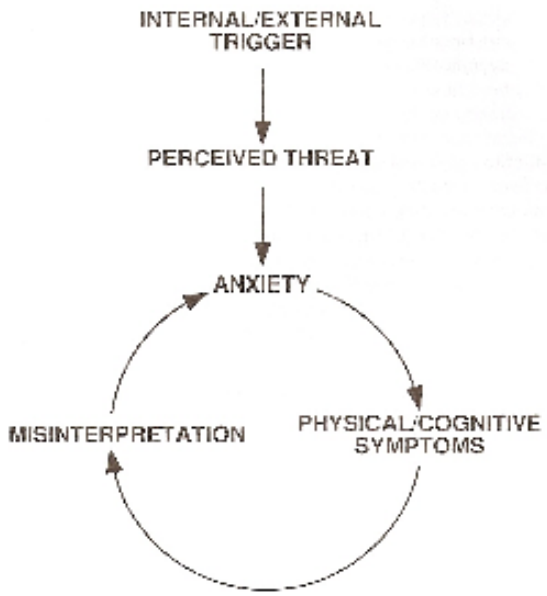

Fig. 1.5 Clark`s cognitive model of panic [Wells, 2008]

In this model any internal or external stimulus which is appraised as threatening produces a state of anxiety and bodily symptoms associated with that state. If these symptoms as interpreted in a catastrophic way a further elevation in anxiety occurs and the individual becomes trapped in a vicious circle that culminates in a panic attack. Once panic attacks have

occurred at least three other factors contribute to the maintenance of the problem: (1) selective attention to bodily events; (2) in-situation safety behaviors; (3) avoidance [Wells, 2008].

Selective attention to bodily events and increased bodily focus can contribute to a lowered threshold for perceiving sensations and may also be involved in increasing the subjective intensity of these events. As a result the patient is more likely to activate the cycle of misinterpretation. Panic patients develop situational safety behaviors aimed at preventing feared catastrophes. These responses prevent disconfirmation of belief in catastrophe and can intensify bodily symptoms. For example, patients who misinterpret feelings of weakness in the legs as a sign of imminent collapse may sit down, hold onto or lean on something, crouch down, put themselves on the floor, or tense the muscles in their legs in order to prevent collapse. The symptom intensification effect of safety is the most evident in panic patients who misinterpret breathlessness or shallow breathing as a sign of suffocating and take deep breaths, or try to control breathing in order to avert the feared catastrophe. These control behaviors can lead to symptoms of hyperventilation: dizziness, dissociation, heightened breathlessness, etc. Finally, avoidance is a maintaining factor in panic. Avoidance of anxiety-provoking situations, such as crowded shops, or activities such as exercise restricts the patient's opportunity to experience anxiety and to discover that it does not lead to catastrophe [Wells, 2008].

1.7.4 Differential diagnostic and comorbidity

The somatic symptoms which are present in a panic disorder makes the patients seek somatic medical care and therefore often misdiagnosed [Statens helsetilsyn, 2000]. A study showed that there were 38% of patients seeking help at a cardiovascular polyclinic who suffered from panic disorder, whereas only 16% had heart disorder. Only 3% of all the patients who was later diagnosed with panic disorder had got the correct treatment the first time [Letnes, 2002]. Differential diagnostic can include: cardiovascular, neurological, gastrointestinal, airways- and endocrine disorders. Attacks in younger patients with unclear somatic symptoms, panic disorder should be evaluated. Other anxiety and psychiatric disorders are also of great importance in differential diagnosis and comorbidity, e.g. hypochondria, personality disorder, psychotic disorder, hyperkinetic disturbances and depression [Statens helsetilsyn, 2000]. A research found a comorbid relation of PD to asthma; 12,9% of the patients with asthma, suffered from PD with or without agoraphobia. They

found no relation to the severity of the asthma [Valenca et al., 2006]. Presence of asthma may increase the risk of developing PD through a variety of cognitive and behavioral mechanisms, including producing threatening bodily sensations that could trigger panic among susceptible individuals [Lehrer et al., 2008]. The risk of suffer from a depression is high, about 50% of patients with panic disorder ultimately experience an episode of major depression. Depressed PD patients are less likely to respond to treatment than non depressed subjects [Marchesi, 2008]. The comorbidity of panic disorder and depression has significant and potentially ominous prognostic implications; the high rates of suicide attempts in panic disorder are further exacerbated by the presence of a comorbid depression [Gorman et al., 1996]. Up to 90% of children and adolescence with PD show comorbidity with other anxiety disorder (GAD, separation anxiety disorder, agoraphobia and social phobia) or major depression disorder [Rasim et al., 2003]. Analysis of the development of psychopathology in a large longitudinal sample of offspring of parents with and without panic disorder and major depression revealed that separation anxiety disorder significantly increased the risk for the subsequent development of agoraphobia, generalized anxiety disorder, panic disorder, and major depression, while agoraphobia significantly increased the risk for subsequent generalized anxiety disorder [Biederman et al., 2007].

1.7.5 Prognosis and course

Panic disorder is highly treatable, with a variety of therapies. Once treated, panic disorder does not lead to any permanent complications. Without treatment, panic disorder can have very serious consequences [Statens helsetilsyn, 2000], and is linked together with increased morbidity [Dammen, 2002]. The immediate danger is that it can often lead to phobia, which is because of the fear of having another panic attack. In example, a patient experiences an attack during driving, and start to avoid driving until an actual phobia develops towards driving. In worst case scenarios, people with panic disorder develop agoraphobia; because they believe by staying inside they can avoid all situations that might provoke an attack [The society for neuroscience, 2002; Statens helsetilsyn, 2000]. Even the patients, who do not develop these phobias, may suffer from severely reduced quality of life by untreated panic disorder. A recent study showed that people who suffer from panic disorder:

- are more prone to alcohol and other drug abuse

- have greater risk of attempting suicide
- spend more time in hospital emergency rooms
- spend less time on hobbies, sports and other satisfying activities
- report feeling emotionally and physically less healthy than non-sufferers
- are afraid of driving more than a few miles away from home [American psychological association, 2009].

The prognosis is worse if the patient also suffer from a personality disorder [Statens helsetilsyn, 2000].

1.7.6 Treatment

Panic attacks are the core feature of PD, yet other symptoms and functional impairment in daily life must be taken into account in evaluating the outcome of treatment. Therefore, the assessment of limited symptom panic attacks, anticipatory anxiety, phobic avoidance and depression is fundamental during treatment and the clinician must carefully monitor treatment to ensure that an optimal response is achieved. Current, available clinical practice guidelines for the treatment of PD recommend pharmacotherapy or cognitive behavioral treatment, as effective treatments. These recommendations have recently been confirmed by a meta-analysis, comparing the efficacy of CBT, pharmacotherapy and placebo in PD. Pharmacotherapy and CBT was superior to placebo, and showed a similar effect in alleviating agoraphobia, depression and poor quality of life [Marchesi, 2008].

Treatment of panic disorder with or without agoraphobia differs from treatment of GAD as follows:

- Evidence based psychotherapy has more long-standing effect than medications [SBU, 2005].
- Serotonin active medications are first choice of medicaments, as the antidepressants [Norsk legemiddelhåndbok, 2004]. The panic-blocking effect of the antidepressants gradually develops after some time. Patients may experience worsening of the anxiety in the beginning. The start-doses should be at a minimum until the panic tendency is under control and the patient's symptoms of

agoraphobia and expectation anxiety is reduced. This usually takes a minimum of half a year to achieve [Statens helsetilsyn, 2000].

- Cognitive behavioral therapy decreases the symptoms of panic disorder without agoraphobia and in panic disorder with moderate agoraphobia. The effect in panic disorder with severe agoraphobia is not evidence based. Exposure sessions given as only therapy decreases the symptoms of agoraphobia [SBU, 2005].

- Antidepressant in combination with CBT or exposure therapy has proven increased evidence based effect compared to the treatments individually [SBU, 2005], and are now the first choice of treatments of panic disorder [The society of neuroscience, 2002].

2. INTERVENTION OF PHYSIOTHERAPY

2.1 The role of physiotherapy in GAD and Panic disorder

Each individual is a connection of the motor and psychosocial function. The human being is seen as a dynamic wholeness, where the biomechanical, neuromuscular, psychomotor and mental functions mutually affect each other and cooperate. The physiotherapeutic main focus in intervention is to strengthen the mentally ill patient's bodily resources and her/his ability to handle bodily malaise [Nyboe et al., 2009]. The physiotherapeutic approach has as a goal to improve the contact with own body, and through this awareness the patient may be able to normalize unfavorable breathing and muscle tension in situations where the anxiety occurs. This leads to better coping of anxiety [Møller et al., 2001]. Physiotherapists are a part of an interdisciplinary field with main focus on bodily resources, through examination, evaluation, and treatment of the somatic symptoms and problems that the patients who suffer from GAD or PD may experience. The examination is basically determining the degree of psychic loads and how it pronounces itself in bodily expressions and discomfort; the patient function level and what limits or promotes the function; the patient relation to own body and determining the

bodily resources of the patient [Nyboe et al., 2009]. Since most patients who suffer from either GAD or PD interpret their troubles as a somatic disorder and therefore seek somatic health care it is important that also this part of the health care unit are aware of these disorders and are able to recognize and detect them [Statens helsetilsyn, 2000]. The physiotherapeutic intervention contributes in this manner to the interdisciplinary team of the patient psychopathology, function level, and needs for treatment and rehabilitation. From the examination the patient subjective complaints, understanding of symptoms and bodily experiences and the objective findings from the physiotherapist are compared to conclude the most likely reason of symptoms [Nyboe et al., 2009].

2.1.1 Physiotherapy as stimulation

All the physiotherapeutic bodily activities and handling stimulates the brain activity. The input from the senses is the foundation of the cognitive scheme. These are a requirement to be able to have automatic movements. With decreased sensory, hence incomplete development of body sensitivity and the body image, it leads to the more or less unconscious movement planner to be hampered. Patients who have sufferings or disorders that lead to reduced body scheme, also obtain decreased motor function. This primarily involves patients with long-term mental disturbances such anxiety. Patients with long-lasting pain sensation in inner or outer body may also have disturbances in the body perception. Therefore it is important that in these patients the motor skills needs special focus [Bunkan, 2008].

2.1.2 Body treatment

Traditionally should physiotherapy affect the whole body when a local symptom is treated, however in practice there are few possibilities for it. It is still of great importance that therapists who work with bodies can integrate relevant research in their thinking and conduction. Postural adjustment is crucial for a satisfying conduct of a movement. Incorrect adjustment of the body appears upon heavy emotions and ergonomic misuse. Both may lead to inconvenient strain on joints and soft body parts, with growing of pain as a response. Many patients should learn effective and appropriate movements with a starting point in a well balanced body posture. Brodal (2001) states that movements should mainly be driven by prediction, which means that the patient should have a clear vision in mind of what that is about to happen. Motor control has to be automatically controlled by stimulation of those areas that organize and coordinates functional movements, and making the automatic

movements as a goal in treatment rather than the arbitrary ones. This emphasizes that the patient should understand the goal and have the cognitive content clear to mind, to be able to exercise purposefully [Bunkan, 2008]. With repeated training sessions, a task can be learnt to a level of automaticity, and encoded for long-term recall [Duff et al., 2007; Bunkan, 2008]. The goal is to obtain a body which is flexible, balanced, well coordinated, and which is strong and persistent. Feedback strategies consist of impulses from the sensory receptors of the vision, vestibular system, skin and the proprioceptors that trigger autonomic postural adjustments. To promote the flow of impulses the patient should exercise by itself, but the home exercises should be controlled in the therapy room to ensure correct performance and avoid improper movement patterns. According to Reed (2001) should all the activities be task-related. It can be as simple as walking, because when the patient firstly thinks about bringing an object (with joy) a determined way, and afterwards performs it, will the swinging of the arms and the trunk rotation move more easily. Only the thought of performing increases the blood flow in the supplementary motor cortex. Brodal (2001) states that all the senses are affected by the emotions and that thought and planning of activities takes place in the same area within the CNS. Feed-forward control by using inner motoric planning and instruction are very useful to obtain a good execution of a motoric action. Activities that are well prepared and are performed with joy has an optimal affect, therefore it is important to get the mood integrated in the body treatment [Bunkan, 2008].

2.1.3 Pain, a compound symptom-complex

Pain is the most important symptom physiotherapists and doctors treat. Pain is a complex experience which includes affective, cognitive and behavioral features, all of which are the result of mental processes and, as such, it represents a psychological condition. There is no disease, illness, or state of pain without accompanying psychological component. The phenomenon of pain, therefore, involves pathophysiological and psychological components that are frequently difficult to interpret [Marazziti et al., 2006; Goodman et al., 2007]. Pain can be interpreted as a psychosomatic disorder. Patients with pain often has other complaints in addition to the pain as; insomnia, headache, anxiety, depression, irritable bowel, paresthesia and peripheral edema in joints of the upper extremities [Bunkan, 2008]. In medicine nomenclature pain is classified according to the ICD-10 as a somatoform disorder (F45.4) [WHO, 1993], with other words a psychic experience [Bunkan, 2008]. Three factors that

influence patients` experiences and reports of pain are (1) biomedical cause, a specific physical cause as tissue damage; (2) ergonomic dysfunctions/overloading; (3) psychic, emotional and cognitive factors [Twomey et al., 2000]. Much of the emotional aspect of pain and illness can be traced to anxiety; feelings such as helplessness, fear, and uncertainty contribute to anxiety and may heighten the patient's perception of pain and symptoms. Anxious patients have a reduced ability to tolerate painful stimulation, noticing it more or interpreting it as more significant than nonanxious persons. This leads to further complaints about pain and to more disability and pain behavior such as limping, grimacing, or medication seeking [Goddman et al., 2007; Way et al., 2003]. When patient experience pain over a long-term period, it is common to develop anxiety and catastrophic thoughts. This leads to a vicious circle, as anxiety leads normally to passiveness, decreased well being and movement refusal, which again leads to increased pain and more anxiety [Johnsen, 2007]. In a study of patients with panic disorder, at least 40% described chronic pain symptoms and more than 7% took pain relievers daily [Marazziti et al., 2006]. The pain perception can indicate the reason of cause, neurological pains are often felt as shooting, burning and/or violently; muscle pain are often experienced as compressing and muttering, while wound pain stings. Pain is an individual psychic experience, seen as the identical or very similar tissue injury may be felt as extremely painful in some people, while barely felt in others. Research has proven that movement, physical activity, and touch stimulates the endorphins and their pain reducing effect [Johnsen, 2007; Bunkan, 2008], a technique parents have used throughout centuries by comforting and reduce pain in their children by touching them. Experience from physiotherapy shows that pain can be reduced even though the place of pain is not touched or moved, e.g. pain in lungs and heart after surgery can be decreased by massaging the feet or passively moved [Bunkan, 2000].

2.2 Examination

The physiotherapeutic examination involves to a certain degree bodily contact and during some examinations the patient need to undress. These demands of performing determined and maybe unknown movements and eventually being touched can for some patients be epoch-making. The examination should therefore occur during composed circumstances and perhaps be taken over several sessions out of respect for the patients possible difficulties in relation with own body. In addition to GAD and PD diagnosis can the patient suffer from other

disorders as rheumatologic, neurologic or orthopedic, which broadens the physiotherapeutic examination and make it include both psychopathology and somatic problems/comorbidity. The anamnesis is the most important tool for the physiotherapist to get a deepened and profound understanding of the patient's problems. It should take place with the greatest empathy and respect for the patient experiences of concrete problems. This way one ensures a trustworthy treatment alliance which is determining for the effect of following intervention. A thorough anxiety anamnesis includes information of the debut of anxiety, frequency, durance, situations, avoidant behavior, and anxiety symptoms- also the initial somatic anxiety symptom and prospective pharmacotherapy. Typical findings from the examination may be controlled breathing, decreased relation to surface, tensed and shortened muscles possible affected by the body posture and general movement pattern, restlessness, decreased mimic and lack of eye contact. It is of great importance to have the proper information of intake of pharmacotherapy when its side-effects may be an examination finding [Nyboe et al., 2009]. One may use the Pain Assessment Record Form or specific questions screening for anxiety during the examination [Goodman et al., 2007]. See appendix Figure 5.2 and 5.3. After the objective evaluation has been made completed, the therapist can often provide some relief of emotionally amplified symptoms by explaining the cause of pain, outlining a plan of care, and providing a realistic prognosis for improvement [Goodman et al., 2007].

2.2.1 Body awareness

Body awareness comprise of the conscious and the unconscious integrated sensations, perceptions, concepts, affections, memories and images of the body from superficial to inner from the beginning of life [Bunkan, 2008]. The term has traditionally been used in studies of anxiety and panic disorders to describe a cognitive attitude characterized by an exaggerated patient focus on physical symptoms, magnification (''somatosensory amplification''), rumination, and beliefs of catastrophic out-comes. In this conceptualization of body awareness, the number of perceived and presumed potentially distressing body sensations has been widely used as a marker for hypochondriasis, anxiety and somatization, all strongly associated with unfavorable clinical outcomes such as the trajectory of pain [Mehling et al., 2009]. Body awareness is used as an overall concept for experience and use of the body, representing body consciousness, body management and deepened body experience. Body consciousness is the bodily aspect of the person's total consciousness. It contains mental

elements (cognitive thought processes) which include knowledge of the body and its parts, perception of position and movements of the body (kinesthetic sense) and knowledge of the conditions for movement, e.g. basic physiology. Body consciousness also includes emotional elements such as the patient's attitude to his physical capacity and to movements and exercise. Body management is the ability to control the body's position, movements and muscular tone. Body management includes mechanical elements for movement of everyday life (motor ability), and emotional elements for non-verbal communication such as alignment, associated with movements, gestures and mimicry. Body experience is an aspect on body consciousness; it is the experience of the body in the present. The concept can refer to the whole body or parts of it. Body experience can be characterized by sensory or autonomic reactions such as strong heart-beats or burning cheeks. Body experience can be facts or the patient's fantasies, and it can be intensified into deepened body experience which can be manifested as a deep seriousness or genuine joy when exercising. [Roxendal, 1985].
The term body awareness is closely related to the «id» and «ego» from Freud [Bunkan, 2008]. Freud placed a great emphasis on the body as the basis of the ego; he coined the expression body-ego. The body-ego is defined as the psychic representation of one's body and "self", that is the central part of ego, which consists of memories and conceptions about one's own body. Its main function is perception [Roxendal, 1985]. Ego possesses however more than the body awareness such as the higher cognitive processes, norms and consciousness and is therefore important to develop as well function as possible [Bunkan, 2008]. In anxiety disorder the body awareness can be disturbed and changed. In example, the body can be felt as distant and not present and the body can primarily be felt through pain, and the ability to interpret physiological changes such as increased rate of pulse due to physical activity can be interpret as a symptom of another panic attack. These disturbances in body awareness can be painful and also anxiety provoking [Nyboe et al., 2009].

2.2.1.1 Clinical relevance of body awareness

It is of clinical relevance the patients relationship with own body according to how the effect of the treatment will become and to which treatment techniques that should be applied. It is therefore important that the examination of the patient discovers any dysfunction of body awareness mainly through the anamnesis, where the patient explains the pain and how she/he interprets the bodily changes and problems that she/he encounters [Nyboe et al., 2009]. In order to relate to the body it is of practical interest to divide the body into the three layers that

exists in primitive organisms. These are: ectoderm, mesoderm and endoderm, which respond to outer, middle and inner body.

- Outer body: skin and fascia
- Middle body: muscles, skeleton, vessels and nerves
- Inner body: inner organs.

Through these layers the most central information of the body awareness arises:

- Skin; pain temperature and touch
- Proprioceptors/mechanoreceptors (muscle, joints and ligaments)
- Enderoreceptors (inner organs and organ systems)
- Distant senses (vision, smell and hearing)

Perception of these sensory inputs from the receptors forms the foundation of understanding of and fantasies of the body [Bunkan, 2008]. A specified, non-validated, examination of the body awareness is where the patient is instructed to draw herself/himself. Depending on the findings from the examination the relevance of focus on normalization of body awareness is set [Nyboe et al., 2009]. Body awareness scale (BAS) is a clinical evaluation that should give the physiotherapist information about the patient's body awareness as a whole, including the aspects body consciousness and body management. In practical use, it has to purposes:

1. to describe body awareness and general body dysfunctions, as components in psychiatric psychopathology,
2. to measure change between different ratings in order to evaluate the effect of the treatment.

The BAS is based on a model from the Comprehensive Psychopathological Rating Scale (CPRS), and has a combination of reported and observed items; 16 items for reported information from the CPRS and 6 new body items; 31 items for observed information, 13 from the CPRS and 18 new body items. The designations of the items are only brief descriptions; they are used for cross-reference between the "Manual and Movement Test for the Body Awareness Scale" and protocol. A detailed description of the function/symptom and

the scale items is given in that manual. If the definitions of the scale are used as a basis for questions in the interview, the patient's answer should be clear enough for scoring [Roxendal, 1985]. The Body Awareness Rating Scale is an observer-based rating scale that judges the functionality of various visually observed movement patterns; it is exclusively used by specially trained physical therapists in Scandinavian countries, requires extensive training which is not available, translated or used outside these countries and had mixed results for interexaminer reliability [Mehling et al., 2009].

2.2.2 Posture and balance

The posture is central because it is basic for all movements and expressions for feelings and health condition and is the way the individual holds its body. The way depends on biology, social inheritance, body image and the individual emotional status. Psychic and physical state of the day can also influence the expression of the posture [Bunkan, 2008]. Posture may be described also, in terms of muscle balance [Kendall et al., 1993]. Linked with increased muscular tone the patient with anxiety held their body in an excessively stiff and upright manner [Williams, 1997]. As is true in all testing, there must be a standard when evaluating postural alignment. The ideal skeletal alignment used as a standard is consistent with sound scientific principles, involves a minimal amount of stress and strain, and is conducive to maximal efficiency of the body [Kendall et al., 1993].

2.2.2.1 Link between anxiety, balance and posture

The control of quiet upright stance is accomplished through a delicately orchestrated activation of the musculoskeletal system, which involves a combination of vestibular, visual, and somato-sensory inputs. These inputs are part of neural feedback mechanisms that operate through, and along, the spinal cord and the brainstem for the purpose of balance control. Furthermore, various higher brain structures like basal ganglia, cerebellum and cortex are implicated in balance control. Disturbances in any of the systems that govern balance may result in balance disorders, e.g., due to reduced vestibular functioning or due to problems with the regulation of tonic motor output. Perhaps surprisingly, balance disturbances can also result from excessive activity in limbic structures that subserve emotionality, in particular fear and anxiety. Several studies have found impaired balance in individuals with anxiety disorders and, conversely, elevated levels of anxiety among individuals with vestibular disorder. These

patterns of comorbidity suggest that balance disorders and anxiety disorders share a common pathology. This comorbidity is likely mediated by shared neural circuits, in particular the parabrachial nucleus network. The parabrachial nucleus is a major brain stem relay centre for visceral information that includes a vestibulo-recipient region as well as projections to the vestibular nuclei. It has also reciprocal connections with the central amygdaloid nucleus and has been frequently cited as a substrate for anxiety and panic disorders. If there is indeed a link between the neural structures that govern balance and those that govern anxiety, then balance disorders may - in principle - benefit from interventions aimed at reducing anxiety. Conversely, individuals with anxiety disorders should benefit to some extent from balance training [Stins et al., 2009]. A research performed by Stins et al. (2009) found postural anomalies in children with elevated anxiety levels and postulated that these anomalies are in part due to an excessive attentional focus (possibly related to hyperviligance) to the own body [Stins et al., 2009]. Redfern et al. (2007) found that people who suffered from GAD without panic and PD with agoraphobia responded differently than did control subjects in a study to determine postural sensitivity to moving visual environments. It appears that the anxiety patients were less capable of ignoring the misleading visual information, i.e. they were more visually dependent [Redfern et al., 2007].

2.2.2.2 Main posture types

An illustrating example on how the posture can be affected by the emotional factor is performed in an experiment by Hunt and Landis (1936). They provoked the startle pattern by firing a gun-shot behind the examination subject. The startle pattern is characterized as:

- Vigorous contraction of all the flexor muscles especially the abdominal muscles
- Elevation and protraction of the shoulders
- Abduction and internal rotation of the upper extremities
- Flexion of the elbows, pronation of forearms, and fisting of hands
- Flexion of spine, hips and knees, possible tiredness in legs- kept breath
- Scrunched face

The pattern can be performed including all the points above or only by a single one [Bunkan, 2008].

Feldenkreis (1976) states that the startle pattern is the prototype of a protection-response that appears in dangerous situations or in connection to stress of a long character. This startle pattern seems to have several joined features in common with shortened postural muscle

described by Janda (1987). Janda sees body posture differently, when he thinks of gait as the most common function of the human body [Bunkan, 2008]. In analyzing the gait pattern, one should not forget that during a step we stand, depending on the speed, at least 85% of the cycle on one leg, whereas only about 15% is spent on two legs. Thus the longest period of the gait cycle is spent on one leg. The period we stand on two legs is substantially briefer and even then we stand on a rather narrow base. The basic effort of the body is therefore to battle against the force of gravity while standing on one leg. As gait is the principal pattern of the static functions, posture should be derived from it. Additionally, balanced standing on two legs is very unpleasant and tiring. Normally, after a while, we transfer the weight of the body to one leg using the other for support only. Form these points it may be assumed that the term ´postural` or ´anti-gravity` should not describe muscles which maintain erect stance on two legs, as is common practice in clinical language. Rather, when referring to muscles which have a dominant postural function, we should consider those whose activity is necessary to maintain erect posture in standing on one leg only. The muscles which maintain erect posture in standing on one leg are exactly those which show a striking tendency to get tight [Janda, 1983].

In addition to the tense flexion-posture there exists a typical flaccid flexion posture. This posture is often difficult to differ from the tense flexion-posture. By movement testing one can differ those postural patterns apart, when flaccid flexed-posture is more often connected to hypotonic muscles. A clear antagonistic posture type is the extension-posture. The posture is dominated by increased tension in anti-gravity muscles. Clinical experience implies that the extension-posture in some people is influenced by the action of the individual in “pulling himself together” and “straighten up”, to cover the uncertainty which is visible in the flexion-posture. People who clearly stand in the extension posture will most likely also be tensed, due to increased contractions in both flexion and extension muscles of the body. This is often seen in people with anxiety. However, most postural patterns are a mix of the patterns that are mentioned [Bunkan, 2008].

2.2.2.3 Assessment of posture

Methods for assessment of body-posture and muscular tension have been developed in Norway by Bülow-Hansen, Heir-Bunkan and Johnsen. They have developed variations for

"psycho-motor investigation". These assessments are mainly based upon inspection of body posture (lying and standing) and palpation of muscles. The therapist records her observations mainly by coloring a human figure according to the qualitative conditions in the muscle. Ostbye-Sundsvold has quantified this information by transforming the colors into numbers [Roxendal, 1985]. The inspection of the posture in standing should commence as soon as the patient enters the room, and the patient's habitual position should be noted [Bunkan, 2008]. Afterwards, should the patient be instructed to the anatomical position; erect posture, face forward, arms at sides, palms of hands forward with fingers and thumb in extension. When viewing a posture in standing, a plumb line is used to represent a line of reference. The point in line with which a plumb line is suspended must be a standard fixed point [Kendall et al., 1993]. From the results of postural investigation in standing, one should find the characteristics of the individual posture and see if there is a connection between the faulty alignment results [Bunkan, 2008].

During inspection in supine position it is important to note if the posture maintains the same characteristics as found in standing evaluation, or if the pattern changes and if so, how and when. In a relaxed supine position the lower extremities are slightly separated and externally rotated. Knees and sacrum is in good contact with the support base (which should be a firm, plane base). In ideal position will the physiological curves of the spine be slightly extended, and the dorsal lateral part of thorax should rest on the support base. The head will be in 0-position, no pointing of the chin upwards or downwards. The main part of the infraspinous fossa in the shoulders should rest on the base. Bunkan explains 4 different postures with the seemingly identical flexion-posture that can react totally different in supine lying: in standing position the posture reveals increased physiologic curves of the spine, tensed muscles- especially in the lumbar and cervical area, elevated shoulders and slight flexion in knee and elbow joints.

First posture- In supine the increased curves of the spine and the flexion tendency in knees and elbows extend. The muscle tension is not fixed, and the posture will most likely adapt without great reactions and one does not need to be restrictive with the dosage under normal circumstances.

Second posture- The muscle tension is released and the posture relaxes first after palpation of the muscles or massage has been made. In this case, one may expect moderate reactions to relaxation techniques.

Third posture- Does not release even if the patient lies on the bench for 50 minutes. This posture may even react to the position by increasing the tension, and in this case one should expect the greatest and most persistent reactions to the relaxation. One should carefully evaluate the doses, if any at all, and consider psychotherapy.
Fourth posture- if the posture relaxes immediately and sags out on the bench at once, it is an indication of flaccid muscles. The patient should normally have muscle stimulating therapy [Bunkan, 2008].

The therapist should also note how the patient relates to the supine position in general- does the patient lie with arms and legs crossed; is she/he uneasy; what happens to the breathing; are there any vegetative or emotional relations and so on. One superior rule: when there are clear clinical findings, one knows something of the patient. If there are no clinical findings, one knows nothing of the patient [Bunkan, 2008].

2.2.3 Respiration

Respiration is closely linked to the emotional and mental status, and different state of mind affects the breathing in different ways [Nyboe et al., 2009]. Autonomic breathing is not only controlled by metabolic demand but also constantly responds to changes in emotions, such as sadness, happiness, anxiety and fear. The breathing has shown more rapid during arousal state and it changes when subjects look at photographs, which induces emotional changes [Homma et al., 2008]. The respiration becomes quick, superficial and in upper thoracic when worrying, as hyperventilation is a known symptom in anxiety. Vice versa, the breathing is calm and harmonic when mind and body is relaxed. The respiration reacts immediately to the present state, but can also be chronically changed due to long-term burden. The respiration is therefore one of the body's function that expresses the most direct degree of psychic load, hence it is very important to examine and interpret. The evaluation of the respiration takes place under the whole examination session. It should be noted if the respiration is free, if it changes and adjust according to movements and level of activity, where the respiration movement occurs, and if the patient becomes short of breath. During the anamnesis the physiotherapist ask about the respiration, if the patient experience the breathing as difficult and if so, to which situations or emotional states it is linked as e.g. anxiety, and of what impact the breathing has in level of functioning, e.g. participation in physical activities [Nyboe et al., 2009].

2.2.3.1 Link between respiration and anxiety

The change in respiration is associated with acute and chronic anxiety. Respiratory change is a sensitive index of both trait and state-anxiety and even small changes in respiration can significantly alter arterial carbon dioxide tension (PCO2) which, in turn, has a large effect on cerebral blood flow (CBF) [Giardino et al., 2007]. Panic patients demonstrate lower resting levels of CO2 when compared with general anxiety disorder patients and normal control subjects. Moreover, these respiratory patterns were observed despite there being no difference in baseline anxiety levels between the two patient groups [Hegel et al., 1997]. PCO2 has a large regulating influence on CBF, even greater than other intrinsic physiological factors, such as cerebral metabolism, cerebral perfusion pressure, or cardiac output. So, even small alterations in respiration can produce significant changes in global CBF that is unrelated to regional neuronal activation. This may be particularly true in certain groups, such as those with panic disorder, who may experience greater changes in CBF during periods of hypocapnia. Patients with panic disorder, for example, typically exhibit chronic hyperventilation, breath-to-breath respiratory instability and frequent sighing, even during panic-free periods [Giardino et al., 2007]. Stress-induced hyperventilation produces symptoms that are frequently misinterpreted as life-threatening by patients who are unaware of the consequences of overbreathing. Misinterpretation of these symptoms increases fear and activates the autonomic nervous system, thus increasing respiratory frequency, which causes further CO2 washout and intensifies the hypocapnic symptoms. This creates a positive feedback loop, increasing the panic response and giving rise to a panic attack [Sardinha et al., 2009]. Sustained hyperventilation causes large reductions in global CBF, but even a single sigh can produce a 1–3 mmHg decrease in PCO2, enough to decrease CBF. Respiratory pattern differences are similarly present, albeit less consistently, in other anxiety disorders (e.g., generalized anxiety disorder). Factors associated with anxiety states, such as systemic sympathetic activation also have a small direct effect on cerebral vasoconstriction and can modulate CO2-mediated CBF reactivity and additionally contribute to CBF changes associated with anxiety. Thus, differences in respiratory patterns or PCO2 cannot entirely account for CBF changes associated with anxiety [Giardino et al., 2007]. Whether anxiety enhances respiratory rate or vice versa is a question. The centre for these two outputs may be in the limbic system, particularly in the amygdala. If anxiety increases respiratory rate, these

areas may be activated before the onset of respiration. It is assumed that an increase in respiratory rate is caused by unconscious evaluation in the amygdala and that these two activities occur in parallel. Stimulation of the amygdala produces a rapid increase in the respiratory rate followed by a feeling of fear and anxiety. A period of 350-400 ms after the onset of inspiration may be required for the conscious representation or labeling of the physiological event. Unconscious before labeling may represent emotion, and later an interpretation of the physiological event may represent feeling [Homma et al., 2008].

2.2.3.2 Forced respiration movement

At forced respiration contraction of the muscles around the nostrils, glottis, extensors of the back, sternocleidomastoid, scalenes and the elevation and protraction muscles of the shoulders. Under this function the nostrils widen, the spine is extended; the chest and shoulders are lifted upwards and anteriorly. The forced expiration activates primarily the flat abdominal muscles, intercostals and the latissimus dorsi muscles. The contraction of the abdominals during forced expiration is of great importance since it gives support to the diaphragm to go cranially. During forced respiration are the head and shoulder muscles acting like punctum fixum for the auxiliary muscles. The clinical consequences of active expirations are the tensed and shortened abdominals. The epigastric region may be affected resulting in decreased distance between the xiphoid process and the umbilicus, not rarely seen together with reclined posture. One of the clinical symptoms of tension is increased active expiration in rest. It is not uncommon in people with decreased function of the diaphragm and inspiration position of the thorax. Active expiration leads to loss of the natural recreation which should take place during the resting phase in the respiration cycle. At active expiration the pressure in the lungs increases, the basal parts of the abdomen has decreased function and the ventilation of the lungs decreases. This leads to retention of mucus in the badly ventilated parts of the lungs, hence increasing the risk of bronchitis, inflammation of the lungs and other complications [Bunkan, 2008].

2.2.3.3 Respiration, emotions, tension and disease

Research shows that 80% of those with chronic breathing disorders also met criteria for anxiety and depression [Kunik et al., 2005]. Other research findings concluded that panic attacks and major depression were both associated with a statistically significant increase in prevalence of respiratory disease, lung disease, and comorbid respiratory and lung disease. A similar pattern was evident in the relation between GAD and lung disease and comorbid respiratory and lung disease. GAD was associated with an increased likelihood of having both respiratory and lung disease, but not with having either without the other. This association may indicate that GAD is related to, or may result from, the experience of having more than one severe respiratory disease rather than a shared etiology between respiratory disease and GAD [Goodwin et al., 2002]. The muscles that take part in the armoring of the chest are the intercostales, the large chest muscles (pectoral muscles), the shoulder muscles (deltoid muscles) and the muscles between the shoulder blades. The expression of the chest armoring is essentially that of «self control» and «restraint». The chronic expansion of the thorax goes with a tendency to increased blood pressure palpitation and anxiety, in severe cases of long standing also to enlargement of the heart. Various kinds of heart diseases results from chronic expansion or indirectly as a result of the anxiety syndrome [Bunkan, 2008]. However, an 11-year longitudinal population study found that symptoms of anxiety and depression were associated with decrease in blood pressure [Hildrum et al., 2008].

Decreased function of the diaphragm is especially harmful for the function of the inner organs and the organ system. For this reason anxiety and inhibited emotions are significant in the primary development of diseases and sufferings, both in the inner organs and in the musculoskeletal system. Work on anxiety and emotions and improvement of respiration will thereby have an impact on the regeneration phase after an illness. Experience form therapy shows relaxation of the abdominal muscles often brings out inhibited emotions and anxiety [Bunkan, 2008]. When the diaphragm have reduced movement, the circulation and contact to the pelvic floor are reduced, which are in significance for the function of, and contact with, the hypogastric region and its organs [Møller et al., 2001; Bunkan, 2008]. Reduced circulation and body awareness of this region influence the sexual and genital function, including urinary function. Actual disorders from the reduced circulation area are menstruation dysfunction, hemorrhoids, and cysts and so on. At reduced movement of the diaphragm the muscles of the epigastric region and margins of costae are tensed, and in certain examples one may find hypotonic pelvic floor muscles and/or flaccid abdominal muscles [Bunkan, 2008]. The most

common psychiatric factor that can cause chronic unexplainable pelvic pain in women is general anxiety disorder, panic disorder, agoraphobia and social phobia [Kirste et al., 2002]. The diaphragm insertion on the back represents a key point in the understanding of the relation of respiration and back pain. The insertion points are around the thoracic segment 10-12, the same with transversus abdominis. Quadratus lumborum and psoas major arise from the same area, and these muscles are often tensed all together, and observation of a flattened spine in this area is visible. Both quadratus lumborum and the ileopsoas have fibers that are in synergy with the multifidi and are of significance for the stability of the lumbar spine. Hypermobility in the neighboring areas is not seldom. It is thought that this hypermobility develops as compensation to the decreased movement in thoracic segment 10-12. In tensed people there is often increased muscle tension in relation to the insertion of the diaphragm. Increased tension in the muscles leads very often to shortened muscles. Probably this leads to increased joint compression and to have the disposal of degenerative joint disorders. It is also believable that this may lead to reciting neuropathies due to reduced microcirculation to the small nerves near the spinal cord [Bunkan, 2008].

Together with inhibited respiration the posture can be altered, this is especially seen in asthmatic children. The typical clinical picture of these children is anterior protrusion of the upper thorax as the lower part is pulled in during inspiration phase. This leads to the deformation of the chest. The axial relationship in standing decides the balance in feet. If the patient has not an optimal axial loading, there will be a tendency to contract pelvis and areas around the hips to maintain the balance. This results in inhibition of the free basal respiration [Bunkan, 2008].

2.2.3.4 Assessment of the respiration

The examination of the respiration should be performed in both upright and supine lying position. In complicated patients the examination should also take place in sitting and prone position because the respiration may be completely different in all these four positions. It can be of great use to ask the patient of its own experience with breathing during the anamnesis; whether it feels comfortable, or uncomfortable, are there any symptoms, if uncomfortable-how and what does it mean. The physiotherapist should check correlations between the symptoms and the clinical findings [Bunkan, 2008].

The examination in upright position should be taken from sagittal, frontal and longitudinal plane when the patient is in the anatomical position. In supine position the breathing normally slows down and the movement of the hypogastric region becomes clearer. Asymmetrical or paradox movement where the chest wall is not rhythmical can occur in emotionally disturbed patients and/or in lung disorders. In some anxiety disorders the respiration can be exaggerated in the upper thorax in the supine position, even if the upright breathing was basal [Bunkan, 2008], and over time this type of breathing results in increased tension in the muscles and eventually pain in surrounding areas [Rønning, 2009]. One can measure the movement by the use of a measure tape for the circumference at the level of 10 and 4 costae. Relaxation phase, inspiration and expiration phase are measured. The measurements may indicate how great the expansion of the thorax is and also give information if some movements are of paradox character, meaning that the abdomen is pulled inwards during the inspiration phase instead of out. Observation of muscle contraction during the expiration phase may be a sign of control, insecurity, and active impulse control. The relation between the different respiration phases should be examined, and if any apnea is present, and the adaptation of breathing rate according to activity level. One may ask the patient to perform 5 deep knee bends in a fast tempo to observe if the respiration rate and frequency changes. The ventilation frequency is about 12-15 respiration cycles per minute in adults, and 18-20 in children. In tensed people one may observe rapid and superficial breathing, and slowed [Bunkan, 2008]. Panic disorder is associated with mild hyperventilation [Sardinha et al., 2009]. In anxiety the breathing may be uneven, and the uncontrolled adaptation to new respiration rate severely reduced. A test showed a higher number of sighs by the patients with panic disorder than by the healthy comparison subjects. 53% of the patients with panic disorder made sighs, whereas 48% did not. None of the healthy subjects had sighs in their breathing patterns. The study finding indicated greater irregularity and complexity in respiratory functioning in the PD patients. This finding supports the idea of abnormal regulation of the respiratory system as a key mechanism in panic disorder. There were no significant differences in gender distribution, age, weight, height, body mass index, number of subjects who regularly practiced sports, hours of sports activity per week, illness duration, or severity of clinical symptoms between the patients with sighs and without sighs [Caldirola et al., 2004]. Normally, the ventilation rhythm is observed with a deeper breath in every fourth to seventh breath.

The physiotherapist should also take note whether or not the breathing is hearable, at tension in the throat or disorders of throat/chest the breathing may be hearable. Uneven air in speech

may be caused by tension in the respiration muscles. The same goes for a weakened voice. The resistance in abdominal muscles should also be examined in supine position by the therapist applies pressure with flat, whole hands in the direction of the ribs. See Picture 2.1. The chest should normally be elastic indulgent upon pressure. Resistance to pressure may result from several factors, as the contraction of the muscles (increased muscle tension), stiffness in joints and ligaments. The resistance is believed to appear where the muscle tension has been present for a while [Bunkan, 2008].

Finally, the greater respiratory irregularity in patients with panic disorder does not necessarily imply a specific intrinsic instability in the respiratory system, but it might arise from a more global abnormality in the brainstem neuronal circuits regulating physiological homeostasis functions. This idea is supported by the observation that patients with panic disorder show subclinical abnormalities in the functioning of the balance system [Caldirola et al., 2004].

Picture 2.1 Abdominal pressure measurement in downward and inwards in direction the umbilicus

2.2.4 Movement function and relaxation

Movement testing is a part of the evaluation of the person's flexibility, ability to adjust and its personal security [Bunkan, 2008]. General anxiety disorder has a great effect on the

physical disability, and it is as severe as in severe depression state [Dahl et al.]. Important term in the examination of movement are *own movement*- the ability for a body part to move/swing after it have been moved, also called passive movement; one type responds with resistance to the passive movement, while the other response serves as an assistance. What the difference in these movement responses can be at a psychological level is hard to tell. One can get the impression of an underlying protest in the first response while an exaggerated eagerness to help in the last response. The third type of response gives a floppily answer, which seems like the patient is without own will or she/he has distanced herself/himself from own body. Local stiffness or decreased range of motion must be noted by therapist if present, since it can be a consequence for decreased movement freedom and flexibility in other body parts. The examination should reveal the relaxation ability, the movement character, elasticity, fluency, coordination, areas that interfere with the movement and serves as a blockage. The adaptability upon repeated movements, body awareness, flexibility, activity, stability, balance, breathing and reactions during movement should also be noted. The patient should be instructed to inform the therapist if there is any discomfort or a special felling arises during examination. After the movement testing the therapist should have an overview of how the patient is able to move, if there are any restrictions and how the patient reacts to the different movements [Bunkan, 2008]. With changes in movement function over time the body may be overloaded, hence a direct reason for pain. Specific examination of joint movement should also be included [Nyboe et al., 2009].

2.2.5 Soft tissues and muscles

To understand the importance of the soft tissue it is important to bear in mind that the motor system is embedded in soft tissue layers, and that even muscles and muscle fibers have their sheaths of connective tissue. Indeed, motion of the motor system proper would not be possible if all its surrounding soft tissues, including skin, would not stretch or shift. These movements are quite considerable and must be diagnosed, for their disturbance can seriously jeopardize the function of the motor system, not just by mechanical action, but by reflex mechanism [Lewit, 1999].

2.2.5.1 The skin

The skin is of great importance to people's health. The skin have about 640 000 sensory receptors which is linked to the spine. By this manner the skin is in contact with the superior

centers in the brain. The skin reacts on emotions and experiences, possibly in a stronger way than the muscles. The most important sensory organs in the skin are the ones for pain, temperature, and pressure. Its color, temperature, moist, smoothness, elasticity and greasiness can together reveal a person's condition of health, by reflecting the reactivity in the autonomic/endocrine nervous system. The skin has multidimensional movement, and normal skin movement is important for the function of vessels, nerves, lymph vessels, fascia, muscles and joints. The examination of the skin includes two factors; the one being the thickness of the skin tissues and the second one is the elasticity of the skin. Healthy skin feels soft, smooth and elastic, and upon release it returns to its original state at once. In elderly people the return of the skin upon release takes some time, due to increased slackness which is physiological. Flaccid, dry skin may maintain the new shape for some seconds before returning to original state, and the seconds or time should be noted. Maximally tight skin will hardly or not at all be lifted in the first place. Tenderness in skin and subcutis may be difficult to differentiate from soreness or tenderness in the muscles. Subcutis is the most sensitive part and may easily become hypersensitive, and should therefore not be confused with triggerpoints. It has not been proven a systematic relation between the elasticity of the skin and long-term muscle-skeletal pain [Bunkan, 2008]. The mobility of the fascia is bound up with tautness (shortening) of the muscles, established only after careful diagnosis of restriction. Changes in fascia are most characteristic in the chronic stage; it is important to know that the restricted side not be the side where the pain is felt. The technique for diagnosing soft tissues is characteristically uniform, whether one wish to shift or to stretch, one first take up the slack, and without much change in pressure (pull), release occurs after a few seconds; it may last from a few seconds to half a minute, and the therapist must sense it [Lewit, 1999].

2.2.5.2 Muscles

The muscles have been the most classical area in physiotherapy. It is integrated with the body posture and controls the respiration movements together with the movements in general [Bunkan, 2008]. Myalgia, or muscle pain, can be present in anxiety and depressive disorders [Goodman et al., 2007]. The muscles are affected by several factors as contractibility, exercise condition, work conditions, muscle tension (contraction), fat, circulation, changes in connective tissues, and emotional relationships [Bunkan, 2008]. The most consistent finding in patients with anxiety is increased muscle tension [Hoehn-Saric et al., 2004]. Increased muscle tension is typically seen in general anxiety disorder due to the mobilization of the

muscles which the anxiety evokes, but the body is enable to use all of it [Dahl et al.]. The therapist must sort out bones, skin, subcutis, connective tissues and the muscle fascia and other soft body parts before the muscles can be evaluated. When palpation of a muscle it should be noted the different qualities of the muscle; its stiffness, fluid tension (which depends on the venous, arterial and lymphatic relations); muscle mass; homogeneity, and muscle tension. At venous failure the tissue becomes edematous, doughy or leathery. Arterial failure makes the tissue dry, and stringy, while lymphatic failure hardens and frigidly the tissue. Reich (1942) claims that increased muscle tensions are a part in the individual neglect mechanism. Waal shows that hypotonic muscles also are a part of the neglect system, by "making itself dead" from emotions and impulses from the body. The same type of tonus appears so as a psychic tiredness, resignation, depression and "ego" weakness; last being an accepted interpretation on Norwegian vegototherapy. Lerang-Svendsen point out that hypotonic muscle is an expression of a passive and weakened defense [Bunkan, 2008]. Joint pain (arthralgia) often accompanies myalgia and joint pain in presence of fatigue may be a sign of anxiety [Goodman et al., 2007]. Several therapeutic body theories describe how psychic load can influence the level of muscle tension in the body by increasing or decreasing it. Many anxiety patient`s complaint of general tension, difficulty relaxing or diffuse pain, other experience their muscles as dull and lifeless [Nyboe et al., 2009], e.g. both in crude and adjusted regression analyses, depression and anxiety were highly significantly linked with increasing levels of neck pain [Blozik et al., 2009]. In the physiotherapeutic examination the link between the pain complaint and the muscle tension is investigated and how the tension relates to the psychic tension, and if the function in everyday life is affected and how. Emotional conditioned muscle tensions that are treated locally have a tendency to improve, but many of the patients notice shifting of the tension to another body part. Treatment of the whole body may contribute to prevent this from happening. The anamnesis, range of movement testing, posture examination and palpation of the muscles contributes to the reached result of the muscle tension [Nyboe et al., 2009].

2.2.6 Autonomic reactions

In anxiety and other disorders of psychiatry the activation of the sympathetic part of the autonomic nervous system is on. The autonomic reactions are equal to respiration and muscle

tension in relevance to symptoms in anxiety [Nyboe et al., 2009]. However, autonomic changes are found less consistently as a finding in anxiety than muscle tension [Hoehn-Saric et al., 2004]. Typical reaction is blushing, increased perspiration, elevated pulse, feeling of restlessness, "nervous stomach", and diffuse complaints of pain. Many of the patients with anxiety experience these autonomic reactions as very uncomfortable and may even be the reason of social avoidance and exclusion from physical activity [Nyboe et al., 2009]. The autonomic reactions may also be provoked by mechanical affection of the connective tissue or subcutis, or by violent pain or by chock. Other autonomic reactions that should be noted during the examination are; skin temperature- which turns cold in anxiety and with decreased blood flow; color of the skin- paleness or white color indicates anxiety; moist/dryness in skin; dryness in mouth- often due to medicaments or worrying; odor- in anxiety the sweat can smell quite strongly and the body odor may also be stronger; sounds- audible respiration may indicate tension in throat or mucus in airways, squeaky sound from intestines indicates tension, while rumbling sounds indicate free passage. The registration of the autonomic reactions should be done during the whole examination, especially during palpation [Bunkan, 2008]. Patients with PD rated higher than patients with GAD in body sensations questionnaire, indicating heightened concern with bodily functions. This finding is consistent with the idea that patients with PD interpret physical sensations as dangerous and patients with GAD interpret them as anxiety, indicating that patients with PD report significantly more autonomic symptoms than patients with GAD [Hoehn-Saric et al., 2004].

2.2.7 Physical activity

Recent study found that the activity level in people with psychic disorders equals wheelchair users. The physical level and reasons for a low level is necessary to evaluate to be able to motivate and adjust a proper treatment [Nyboe et al., 2009]. An important clinical observation is that many people experience a paradox anxiety increase in the beginning of the physical activity. This is because of the physiological activation of the sympathetic nervous system, with symptoms of palpitation, increased perspiration and increased breathing, which occurs during exercise as well as in anxiety. However, when the patients are informed of the possible reaction, they may be able to perform the activity with a good result [Martinsen, 2000]. Patients with PD, patients with GAD, and controls show little difference in their physiologic responses when not registering anxiety in a study, except for a trend in patients

with PD to have a faster heart rate throughout the day and a possible reason to this is that patients with PD do less physical exercise than nonanxious subjects [Hoehn-Saric et al., 2004].

2.2.8 Personal care

Some psychic disorders are related to difficulties with personal hygiene and general physical healthiness. Evaluation of the personal hygiene, level of physical activity, eating habits, smoking and reasons for difficulties with personal care should be a part of the examination. The evaluation is primarily noted during the anamnesis and thereby highlights aspects of the patient relation to its own body. By evaluation rise possibilities to encourage and offer techniques to improve the state, by physical activity, or guiding from a nutrition specialist as a part of the rehabilitation [Nyboe et al.,2009].

2.2.9 Mental presence

Evaluation of the mental presence is basically observation and non-specific findings. Difficulties with eye contact, wandering, distant or introverted look, difficulties with maintaining focused, inadequate effects and sayings or double meaning communication is what the physiotherapist should concretely focus on. It may be an expression of what the psychopathology consists of and it may of significance when making the treatment plan [Nyboe et al., 2009].

2.3 Treatment

Based on the results of the physiotherapeutic examination the treatment plan will be made together with the patient. This plan will most often involve body awareness therapy, where the focus is to sharpen the patient`s contact with own body, which involves awareness of the bodily symptoms in order to work with the anxiety reducing techniques. Some patients describes that the anxiety makes them loose control over their body, and to restore this loss of control is one of the main goals of anxiety reducing therapy. If the patients with cognitive difficulties have problems with verbalizing the bodily symptoms, can the anxiety treatment mainly consist of relaxation techniques and gathering massage without demands of

verbalization. The progression of the therapy should be primarily exercise of the techniques in clinic with the physiotherapist, and afterwards practice the techniques at home, and thereafter use them in anxiety provoking situations. As a part of the treatment plan a determined limited course has been set, and the patient is informed that the anxiety may be worse in the initial state of the treatment course [Nyboe et al., 2009].

There exist many varieties of anxiety reducing treatments, but a typical treatment plan includes techniques in psychoeducation, relaxation, breathing, grounding and exposure as basic elements [Nyboe et al., 2009]. The methods and techniques from the variety of physiotherapy areas can only be used when understanding the effect of the chosen action [Bunkan, 2008]. In the emerging paragraphs it is therefore only referred to the appropriate methods and techniques according to the literature.

2.3.1 Psychoeducation

Clinical experience show that the cognitive access to physiotherapeutic treatment of anxiety patients is most applicable, when the patients gets a understanding of the ability of anxiety to appear in the mind, feelings, body and behavior clearly realized upon exposure in home assignments. One can use a so called five-column-scheme to make an overview of symptoms both by patient and therapist or an eight response columns comprise the worrying thought record which are used in treating GAD [Nyboe et al., 2009; Wells, 2008]. See appendix Figure 4.2. The psychoeducation is used in the initial part of the therapy to the physiological reactions to an anxiety attack. This increases the patient understanding of the symptoms and may thereby motivate the patient to work with anxiety reducing techniques [Nyboe et al., 2009]. Psychoeducation is suggested for any treatment modality in children and adolescents with PD, where patient and parents should be educated about the clinical characteristics, pathophysiology, course and treatment of PD. Effective psychosocial treatment models for PD in adults largely based on cognitive and cognitive-behavioral theories. These models suggest that the insidious spiral into panic is due to catastrophic misinterpretations of otherwise normal bodily sensations [Ramsin et al., 2003].

2.3.2 Relaxation and breathing techniques

Relaxation exercises offer a means to reduce the physiological and psychological reactions to stress [Kjellgren et al., 2007]. Relaxation techniques are often used in connection to muscle tension and rigidity to obtain a purposeful tonus in order to prevent injuries and arthrosis. However, relaxation is also of highly use as mental relaxation to obtain mental presence, avoid stress, and reduce anxiety. The effect of relaxation is confirmed in several research papers where there is evidence for relaxation as an effective treatment of panic disorder and general anxiety disorder [Nyboe et al., 2009]. The different relaxation techniques often lead to specific psychological and physiological changes termed the 'relaxation response' (RR). The RR is identified as the physiological opposite of the stress or 'fight-or-flight response'. The RR is associated with instantly occurring physiological changes that include reduced sympathetic nervous system activity, reduced metabolism, lowered heart rate, reduced blood pressure, and decreased respiratory rate. At the psychological level, individuals typically report that RR techniques result in genuine rest, recovery from fatigue, better sleep quality, as well as an increased sense of control and efficacy in stressful situations [Kjellgren et al., 2007; Peters et al., 1977]. Muscle relaxation techniques are important adjunctive therapy for anxiety-related conditions [Rapp et al., 1984]. An evidence review indicated that three studies found that this intervention produced no greater reductions in persistent anxiety compared with a control condition, although two studies did find that such training resulted in greater decreases in short-term anxiety [Parslow et al., 2008]. Progressive relaxation, applied relaxation, autogenic training and meditation show great efficacy in decreasing anxiety against the combination of more than one methods and the other techniques, and the efficacy of the treatment increases with the duration of the protocol. Repetitive training over a long period product significantly higher modification [Manzoni et al., 2008]. Behavioral interventions such as diaphragmatic breathing have been shown to reduce anxiety levels and improve coping capability in stressful situations. Therapies identifying negative stress coping patterns and replacing them with positive outlets are effective means of controlling and treating anxiety [Cooley et al., 2009].

2.3.2.1 Mental training

The mental images and fantasies of the individual have a controlling effect of the body and its functions. The therapist contribution to make clarity by means of therapeutic images is

important. It can be as simplified as giving the patient the awareness of how an optimally exercise is performed or how the posture can become when it is optimal for the patient. The sport field has shown a great interest of mental training and research show encouraging results from this training [Bunkan, 2008]. Resent study in Sweden, showed that cognitive training results in biochemical changes in the brain, which can have significant meaning for possible prevention of disorders related to cognitive function [Nilsen, 2009]. Various multicomponent therapies based on the cognitive behavioral paradigm, which include techniques to lower physiological arousal (relaxation training), reduce cognitive misinterpretation (cognitive restructuring), develop coping skills, breathing retraining, interoceptive exposure, and exposure to feared stimuli are found to be effective compared to single-component therapies in the treatment of panic disorder [Manjula et al., 2009].

2.3.2.2 Autogenic training

Autogenic training, developed by psychiatrist and neurologist, Dr. Johannes Schultz (1844-1970), is a therapeutic method involving simultaneous management of mental and somatic functions [Greene, 1999; Sargent et al., 1973]. The training teaches the patients to relax by provoke a feeling of heaviness, warmth, and calmness. The therapist guides the patient by verbal instructions [Nyboe et al., 2009]. A goal of the autogenic training among others is to liberate the patient from unwanted impulses and to exploit the post-hypnotic suggestions. Well performed should the training give the patient greater ability to self regard and self awareness and reduce anxiety [Bunkan, 2008; Institute of Serenity, 2009]. A telephone-based collaborative care strategy with psychoeducation for delivering guideline-based care for PD and GAD significantly improved a broad range of anxiety, depression, mental health-related quality of life, and employment outcome measures at the 12-month follow-up in a randomized trial [Rollman et al., 2005].

2.3.2.3 Progressive relaxation

Progressive relaxation according Jacobsen focuses on reducing muscle tone in major muscle groups. Each of the major muscle groups is tensed and then relaxed in sequence [Dehdari et al., 2009]. The theory of the progressive relaxation is that the patient should learn

to recognize tension for thereby more easily relax and decrease the muscle tension. Since the technique is quite time demanding there has developed similar techniques which share the same main focus [Nyboe et al., 2009].

2.3.2.4 Applied relaxation

Applied relaxation (AR) in which training in a specialized and portable relaxation technique is combined with exposure to feared situations. In a controlled trial applied relaxation was more effective than traditional progressive muscle relaxation training plus exposure [Clark et al., 1994]. The purpose of AR is twofold: (1) teaching the patient to recognize early signals of anxiety, and, (2) learning to cope with the anxiety instead of being overwhelmed by it. The first phase of AR includes teaching the patient to relax with t he help of progressive relaxation [Øst, 1987]. Applied Relaxation has been adopted for uses in treatment of generalized anxiety disorder. In two recent studies, applied relaxation has proven to be equally as effective in treating GAD as cognitive therapy, which demands much more of the therapist [Manzoni et al., 2008]. However, in a follow-up research there was some indication that the cognitive therapy treated GAD patients did better that applied relaxation treated GAD patients [Øst et al., 2000]. Multiple comparisons indicate that CBT is superior to applied relaxation in treatment of panic disorder [Clark et al., 1994].

2.3.2.5 Mindfulness Based Stress reduction

Mindfulness is inspired of the Indian meditation technique Vipassana- to see the reality as it is. The mindfulness based stress reduction program (MBSR) involves element like mediation, yoga, and stretching exercises where the patient is trained in "being attentive in a special way, in the actual moment and without judging its experiences" [Nyboe et al., 2009]. In addition to the mindfulness meditation practice that forms the basis of the intervention, patients are taught diaphragmatic breathing, coping strategies, assertiveness, and receive educational material about stress. MBSR has been used to reduce morbidities associated with chronic illnesses such as cancer and acquired immunodeficiency syndrome and to treat emotional and behavioral disorders [Ospina et al., 2007]. A three-year follow-up intervention conclude that an intensive but time-limited group stress reduction intervention based on mindfulness meditation can have long-term beneficial effects in the treatment of people diagnosed with general anxiety disorder and panic disorder [Miller et al., 1995; Vibe, 2003].

2.3.2.6 Grounding

Grounding is defined as the patient`s relation to the ground surface in whatever position or movement. It involves partially the balance between the downwards and upwards power in the physical body in relation to the gravity force, and partially the trust from the patient that the surface are able to carry hers/his whole personality. Grounding contain a very important mental aspect about being anchored in own life. This is applied in the therapy through the posture in standing, lying and moving position. E. Thornquist and Berit Heir Bunkan account for that people's emotional status in the moment and over time is dependent on how the gravity affects the body. E.g. when sad and resigned the posture sinks to flexion and the gravity intensifies the flexion posture. Grounding treatment includes improvement of the gravity connection and greater awareness of the body, through proprioceptive stimuli and the tactile sense of the patient. It is often combined with Body awareness therapy. [Nyboe et al., 2009]

2.3.2.7 Body Awareness Therapy

The fundamental basis of Body Awareness Therapy (BAT) is the somatic, biological knowledge taught in traditional physiotherapy. In practice, Body Awareness Therapy differs from traditional physiotherapy by stimulating sensory awareness and concentrating the main interest on exercises aimed at total coordination. If treatment of movement functions is given with a sufficient degree of sensory activation, emotional reactions occur. Body Awareness Therapy is thus based on a biological foundation, but is also associated with emotional reactions [Roxendal, 1985]. In BAT the main focus is movement, breathing, massage, attention to balance, free respiration and presence. To integrate the body ego in the total identity awareness should the following functions be exercised; relation to the surface, imaginary centre of alignment, centration and respiration [Nyboe et al., 2009]. The Body Awareness Therapy is intended for treatment of diseases where disturbances in body awareness are an important part of the pathological picture. It can be used in psychotic states with disturbed body consciousness, body image and psychomotor behavior as well as neurotic states with depreciation of the body or appearance or disturbances of body management and psychosomatic disorders [Roxendal, 1985].

2.3.2.8 Feldenkrais method

Feldenkrais, born in 1904, developed a school of relaxation which is based on two methods, one for group training, Awareness Through Movement, and one for individual treatment, Functional Integration [Aulid, 2008; Nyboe et al., 2009], a series of movement explorations to help us learn to recognize our physical habits and introduce more efficient, healthy patterns [Leverone, 2003; Krugman, 2002]. The goal of Awareness Through Movement is to re-activate co-ordinations which are lost in present-day use of the body or as a result of injury [Roxendal, 1985; Nyboe et al., 2009]. The method often starts with a small movement, which during several repetitions develop into a co-ordination that engages the whole body. This kind of training requires total mental presence. Feldenkrais calls his method a "body-mind method" [Roxendal, 1985].

2.3.2.9 Breathing retaining

Techniques such as breathing retaining may be beneficial to individuals with anxiety disorders if they are taught to use this skill as a relaxation technique rather than an avoidance or distraction technique. Schmidt and colleagues (2000) conducted a dismantling study of a treatment for panic disorder and found that not only did the addition of breathing retaining aimed at avoidance of emotion not add to the efficacy of the treatment, it was associated with worse outcome than exposure and cognitive restructuring alone but a reason for this may lie in the intention in which a technique is employed in treatment and how the client is educated as to how and when to use the skills [Amstader, 2008].

2.3.3 Yoga

Yoga has its origin in ancient India and in its original form consisted of a system of spiritual, moral and physical practices. Yoga is defined as a practice consisting of three components: gentle stretching; exercises for breath control; and meditation as a mind-body intervention [Kirkwood et al., 2005]. The most central and common aspects of yoga practice today are different bodily postures (asanas) and breathing exercises (pranayamas) that aim to focus the mind, achieve relaxation and increase wellness. Studies reported beneficial effects

of yoga on anxiety, stress reduction and general well-being. Participants in a yoga program that emphasized on breathing exercises had strong decrease in the experience anxiety, however there was no clinical anxiety in the participants, but they were in the borderline between normal and anxiety diagnosis according to the Hospital Anxiety Depression Scale [Kjellgren et al., 2007]. A systematic review of research evidence of yoga for anxiety found that owing to the diversity of conditions treated and the poor quality of most of the studies, it is not possible to say that yoga is effective in treating anxiety or anxiety disorders in general [Kirkwood et al., 2005].

2.3.4 Mensendieck method

Mensendieck (USA, 1862-1957) developed a training program for posture and muscular tone. The purpose was to cure or prevent musculoskeletal disorders, such as poor posture, hypo- or hypertension in the muscles or muscular pain. Mensendieck placed the main emphasis on movement training leading towards body awareness through muscular control [Roxendal, 1985]. This method is based on an understanding of the human movement pattern as a interaction between cognition and motor ability. Through exercises and work with the breathing, which evokes awareness of posture and the use of muscles, does the patient obtain contact with and understanding of unfavorable muscle tensions and movement patterns [Kirste et al., 2002]. A research showed that Mensendieck therapy for gynecological chronic pain, not only reduced the pain but also decreased anxiety and depression [Stewart et al., 2008]. Experience indicates that Mesendieck therapy is very useful in treating patients who present with chest pain, without any somatic disorder, but who suffers from PD or GAD [Dammen, 2002]. Specially trained physiotherapists utilize Mensendieck's method in individual therapy [Roxendal, 1985]

2.3.5 The Alexander technique

The Alexander Technique (AT) was developed by an Australian actor, Alexander (1869-1955). It aims at improved posture and harmony in movements of everyday life. As a young actor, Alexander several times experienced that his voice failed him completely during recitals. He found that his habit of pulling his head back and downwards as part of a whole body pattern created inhibitions in his movements and voice. Alexander developed a

technique for movement training aimed at influencing the person's pattern of movement as a whole, with the posture of the head and neck as the starting point [Roxendal, 1985]. The Alexander Technique aims to improve postural coordination by consciously altering automatic responses and tonic muscular activity. Alexander taught that tonic muscular activity, kinesthetic perception, and reactivity to contextual stimuli are interrelated fundamental aspects of an individual, which he collectively referred to as the "use of the self [Cacciatore et al., 2005]. Because self-image is linked to postural carriage, it also has an indirect positive influence on personal confidence and social standing, depression, phobias, and anxieties [Engel, 2009]. In particular, Alexander taught that automatic responses to stimuli can become habitual and lead to long-term adaptations of tonic muscular activity that are inefficient and to related decreases in the accuracy of kinesthetic perception. Alexander thought that these adaptations, in turn, reinforce excessive automatic responses and underlie numerous psychophysical conditions such as anxiety disorders and back pain. The few studies that have been performed on the AT suggest that the AT improves functional reach, breathing capacity, and symptoms of Parkinson disease; alters the coordination of sit-to-stand; and reduces the sense of effort to perform movements [Cacciatore et al., 2005]. The Alexander Technique is used by specially trained teachers in an individual setting [Roxendal, 1985].

2.3.6 Touching as a therapeutic tool

Touch is a powerful form of communication despite its relative lack of sophistication when compared with other non-verbal signals [Williams, 1997]. The different tactile stimuli can be used to reduce general tension or to improve the patient's experience of body delimitation. Different types of massage help to decrease anxiety, chosen according purpose of treatment. Some anxiety patients experience difficulties with sensing their own body which results in isolation in order to avoid physical contact with other people. The massage may recreate their bodily limits and contribute to socialization [Nyboe et al., 2009]. The term massage covers a broad spectrum of techniques that have developed from time immemorial; massage can be used to treat soft tissue and even periosteum [Lewit et al., 2007]. Kerstin Unvås Moberg describes the heeling effect that massage can have on the body, by activation and release of oxytocin leading to a lowering of the stress hormone cortisol in the blood, while the production of the pain reliever hormone endophine increases [Nyboe et al., 2009; Parslow et al., 2008]. She also refers to the researchers at Touch Research Institute in Miami

have proven that massage has a general reducing effect on anxiety, both in children and adults [Nyboe et al., 2009]. A study made in Japan found that a 45 minutes facial massage had strong effects on stress alleviation or psychological relaxation, leading to a significant decline in the anxiety scores [Hatayama et al., 2008]. Aromatherapy massage acts on the central nervous system, relieving depression and anxiety, reducing stress, relaxing, sedating or stimulating, and restoring both physical and emotional well-being [Kuriyama et al., 2005] Since various kinds of essential oils such as true lavender, rose, mandarin, sweet orange, sandalwood, geranium, etc have anxiolytic activity, aromatherapy massage has been used for the relief of depression and anxiety and two studies found that state anxiety scores from State-Trait Anxiety Inventory were significantly reduced after aromatherapy massage [Imanishi et al., 2007; Kuriyama et al., 2005]. A review of the evidence for the effectiveness of complementary and self-help treatments for anxiety disorders found no relevant evidence of aromatherapy [Parslow et al., 2008]. Another possibility of touching as a therapeutic tool is the exteroceptive stimulation which is based primarily on stroking, and is indicated in circumstances characterized by minor changes in tactile perception [Lewit et al., 2007].

2.3.7 Physical activity

The goal of physical activity has been to keep the body healthy and maintain motor ability until mental health is restored [Roxendal, 1985]. Two longitudinal studies were identified that examined anxiety as a predictor of physical disability and found three variables that may explain the relationship between anxiety and disability: physical activity, benzodiazepine and psychotropic medication use, and lack of emotional support. Anxiety may cause people to be less physically active, thereby causing disability [Brenes et al., 2005]. Several types of psychic medication affect the appetite regulation which leads to partially loss of point of saturation and thereby the intake of food increases which may result is severely overweight and it may also increase the sedative effect leading to physical inactivity. Overweight is not only a problem for the physical state, but also psychosocial problems like isolation, depression and anxiety is common. Physical activity reduces high blood pressure, strengthens the immunity system and reduces the risk of cardiovascular disorders. Likewise increases the insulin sensitivity in the muscles and reduces the risk of development of diabetes type 2 [Nyboe et al., 2009]. There are gliding transmission between physical activity and physiotherapy, when both involves structural, repeated bodily movements that are performed

to improve or retain one or several components of the human function. The physical activity that is gives by the physiotherapist should be based on the examination findings and the evaluation of which activities that are appropriate for the individual patient [Bunkan, 2008].

2.3.8 Norwegian Psychomotoric Physiotherapy

The Norwegian psychomotoric physiotherapy (NPP) has contributed to the physiotherapeutic understanding of treatment through the body. The method is a result of cooperation between the psychiatrist Trygve Braatøy and the physiotherapist Aadel Bulow-Hansen in the end of the 1940 and the beginning of 1950. NPP is directed towards a general adaptation of the body and not the diagnosis. This initiates an adjustment process that has an affect at different states. When the respiration and movements are less disabled from muscle tensions and the posture has improved stability, the symptoms often changes or reduces. The condition is however that the patient had the possibility to work on the emotions that may have contributed to the muscle tension (the symptom). The psychomotoric physiotherapist helps the patient to register its own bodily reactions and to get rid of unsatisfying way of dealing with those reactions. NPP comprise of somatic treatment, an understanding and a way of thinking that has a holistic view on the human being. Experience from NPP shows that anxiety may occur when the adjustment of respiration is started [Bunkan, 2008].

2.3.9 TENS

Transcutaneous electrical nerve stimulation (TENS) is a commonly used nonpharmacologic and noninvasive treatment for pain. The effects of high-frequency, low-intensity TENS (100 Hz, 200 μsec, 2 mA, for 30 minutes) was reported in “out of hospital rescue” by emergency responders. The findings demonstrated a significant reduction in pain, anxiety, and nausea scores, as well as a lower heart rate response. Similar findings were reported in 63 patients requiring emergency transport for posttraumatic hip pain. This suggests that TENS may also be beneficial in decreasing autonomic responses to acute pain. TENS is consistently more effective than placebo TENS for pain intensity, anxiety, and heart rate in several acute and chronic conditions associated with emergent and postoperative conditions [DeSantana et al., 2008].

3. DISCUSSION

The World Health Organization (WHO) anticipates that psychiatric disorders, in year 2020, becomes the second most incriminating disorders worldwide [Nyboe et al., 2009]. Panic disorder (PD) and generalized anxiety disorder (GAD) are two of the most disabling and costly anxiety disorders seen in primary care [Muntingh et al., 2009]. A number of studies in younger samples have demonstrated that anxiety and work disability (e.g., days of work missed due to anxiety) are indeed related [Brenes et al., 2006].

However, treatment quality of these disorders in primary care generally falls beneath the standard of international guidelines. Collaborative stepped care is recommended for improving treatment of anxiety disorders. One of the reasons for the low quality of treatment is poor recognition of anxiety disorders. Even when compared to depression, the recognition rate of anxiety disorders is low, with about one third of anxiety disorder patients labeled as such by their general practitioner (GP) [Muntingh et al., 2009]. A study shows that health-care providers are recognizing less than 40% of anxiety or depressive disorders in chronic obstructive pulmonary disorder (COPD) patients. Lack of treatment (cognitive behavioral therapy, psychopharmacology, and pulmonary rehabilitation) for anxiety and depression in COPD seems to be the rule rather than the exception, based on data from the few published

studies. In a study of 43 patients with COPD, less than 25% of those with depression or anxiety were receiving any treatment [Kunik et al., 2005]. Patients with different painful syndromes, such as chronic lumbar pain, chronic cervical pain following whiplash or chronic pain due to prostatic cancer, showed an increased risk of anxiety syndromes or disorders. At least 50% of patients show anxiety symptoms and 19% have an anxiety disorder such as panic disorder or generalized anxiety disorder. A prospective study involving 1007 young adults found that a history of headache was associated with a higher risk of panic disorder. On the other hand, anxiety disorders are associated with high somatic preoccupation levels and physical symptoms [Marazziti et al., 2006].

Several factors are involved in this low recognition rate of PD and GAD, such as patients unwillingness or inability to discuss their anxiety problems with their health care practitioner and limited knowledge of the practitioner about psychiatric disorders. Moreover, general practitioners frequently work under time pressure and perceive they have not enough time to enquire about emotional problems. In conclusion, competing demands of the patient, the GP and the primary care structure of acute episodic care make diagnosing mental health problems difficult [Muntingh et al., 2009]. Respiratory disease (e.g., asthma, COPD) and panic attacks are each leading causes of disability, health-care utilization, morbidity, and mortality among youth and adults in the community. Therefore, improving our understanding of the possible relation between these two phenomena, and ultimately determining whether the treatment of one can prevent or at least improve outcomes associated with the other, may have important implications for public health [Goodwin et al., 2002]. Health care practitioners, other than psychiatrist, should also be aware of panic disorder due to frequent comorbidites and several medical conditions that resemble panic disorder [Rasim et al., 2003]. Professionals within health care undergo continuous training throughout their careers. Usually this consists of updates to their already rigorous training, but the importance of rethinking their attitudes to practices which seems outside their field is of great relevance [Kearney et al., 2007]. Physiotherapists may not only be able to detect hidden anxiety disorders but also be a part of the treatment, if the proper knowledge and awareness of symptoms are present.

Treatment for PD and GAD can be highly effective. In recent decades the evidence for the effectiveness of treatments for anxiety disorders has been reviewed and described in clinical guidelines for treatment, where cognitive behavioral therapy as well as prescription of antidepressants is considered as first choice of treatment for PD and GAD. However, these

guidelines are rarely adhered to in primary care. About one third of patients with an anxiety disorder treated in primary care receive appropriate treatment as defined by a minimal accordance with existing guidelines [Muntingh et al., 2009]. Clinical trials have shown that anxiolytic drugs alone have limited long-term efficacy. Moreover, they often have adverse side effects including dependency, drowsiness, impaired cognition and memory and sexual dysfunction. Consequently, clinical community has begun to consider alternative old and new approaches targeting anxiety problems and to examine the merits of combined and tailored somatic and psychological treatments [Manzoni et al., 2008]. For example the study of patterns of postural sway in high anxious children is consistent with the increasing awareness in the psychiatric field that neurodevelopmental disorders may benefit from body oriented treatment approaches [Stins et al., 2009]. Moreover, most studies of patients with anxiety rely on self-reports of somatic symptoms, despite the fact that somatic manifestations often correlate poorly with physiologic states and reactions, and cannot be taken at face value. Most physiologic studies have been conducted in the laboratory, which provides a controlled environment and permits multiple simultaneous recordings but rarely reflects stressors experienced in everyday situations. Therefore, physiologic states and responses in laboratory studies may differ from those experienced by patients in real life [Hoehn-Saric et al., 2004].

The ultimate aim of any prescribed medical therapy is to achieve certain desired outcomes in the patients concerned. These desired outcomes are part and parcel of the objectives in the management of the diseases or conditions. In PD and GAD the difference in the presence of somatic symptoms will be the determination factor of management of the disease in the physiotherapy practice. However, despite all the best intention and efforts on the part of the healthcare professionals, those outcomes might not be achievable if the patients are non-compliant. In healthcare, the most commonly used definition of compliance is “patient’s behaviors (in terms of taking medication, following diets, or executing life style changes) coincide with healthcare providers’ recommendations for health and medical advice”. Thus, therapeutic non-compliance occurs when an individual’s health-seeking or maintenance behavior lacks congruence with the recommendations as prescribed by a healthcare provider. Patients’ beliefs about the causes and meaning of illness, and motivation to follow the therapy were strongly related to their compliance with healthcare. Poor communication with healthcare providers was also likely to cause a negative effect on patient’s compliance [Jin et

al., 2008]. Patient's knowledge about their disease and treatment is not always adequate. Some patients lack understanding of the role their therapies play in the treatment; others lack knowledge about the disease and consequences of poor compliance; or lack understanding of the value of clinic visits. For these reasons, patient education is very important to enhance compliance. Healthcare providers should give patients enough education about the treatment and disease. However, education is not always "the more the better". An "inverted U" relationship between knowledge and compliance existed in adolescents. Adolescent patients who knew very little about their therapies and illness were poor compliers, while patients who were adequately educated about their disease and drug regimens were good compliers; but patients who knew the life-long consequences might show poor compliance [Jin et al., 2008; Dulmen et al., 2007]. Cost is a crucial issue in patient's compliance especially for patients with chronic disease. Healthcare expenditure could be a large portion of living expenses for patients suffering from chronic disease. Cost and income are two interrelated factors. Healthcare cost should not be a big burden if the patient has a relatively high income or health insurance. A number of studies found that patients who had no insurance cover were more likely to be noncompliant to treatment. Healthcare personnel should be aware of patient's economic situation and help them use medication more cost-effectively. The main factor identified relating to healthcare systems include availability and accessibility. Lack of accessibility to healthcare, long waiting time for clinic visits, difficulty in getting prescriptions filled, and unhappy or unsatisfied clinic visits all contributed to poor compliance [Jin et al., 2008].

To build a good and healthy relationship between patients and providers, providers should have patients involved in designing their treatment plan, and give patients a detailed explanation about the disease and treatment. Good communication is also very important to help patients understand their condition and therapy [Jin et al., 2008]. Whatever the physiotherapist does, the work includes a person's body and shortcomings. It is essential to acknowledge that emotional relationship may be affected during the treatment and that the patient may have a reaction to it. There is in this way a gliding transition between physiotherapist and psychotherapy. The boarders are even more unclear the better specialization physiotherapists get in the psychiatric and psychosomatic field. However patients with serious psychiatric sufferings will mainly be referred to a professional psychotherapist or treated in cooperation between physiotherapist and a psychotherapist.

The general principle in physiotherapy is a non-confronting conversation, where there is focus on avoiding the big catharsis resembling, emotional provocation conversation. It is not always possible to know where the patient is emotionally, and in some cases during a crisis it is enough that the therapist remains where she/he is and does not run away. A trustworthy bond must develop naturally and it most often does in combination with process oriented treatments over a period of time. The therapist most important task is to be a lively, devoted and a clear fellow human being that gives healthy reactions to patient's situation [Bunkan, 2008].
By interpretation of the definitions by the WHO that state that `Body functions are the physiological functions of body systems (including psychological functions)' while 'Body structures are anatomical parts of the body such as organs, limbs and their components' and 'Impairment are problems in body function or structure such as significant deviation or loss' [WHO, 2001] the necessity of holistic thinking is clear. To discover and survey anxiety it demands carefulness, sensitivity, time, together with a solid clinical experience and education of the physiotherapist [Kvaal, 1999]. It cannot be sufficiently emphasized, however, that the art of the good physiotherapist consists not only in technical competence but also in ability to motivate patients [Lewit et al., 2007].

I believe that patients will benefit from increased communication and the therapist ability to include the amazing complexity of our mental and physical processes in practice. By using some of the principles in cognitive therapy in PT treatment one can reach a person on several levels, in addition to somatic approach which primarily works on a physical level. The principles may be:

- Helping the patients to change their determination that their problems is unchangeable, meaning helping them in solving their own problems instead of becoming a patient with little hope of master their pain and emotional stress.
- Helping the patients in identifying the connections between thought and external factors that are relevant for the pain and negative emotional stress.
- Helping the patients to relate more effectively to the pain, and negative emotional stress.
- Helping the patients to develop and maintain effective and accurate ways of thinking, emotions and reactions.

A number of literature that tested physiotherapy (PT) and somatic treatment approaches as an intervention with respect to anxiety disorders- PD and GAD are described in this review. The overall reporting of studies linked directly to the role of physiotherapy in PD and GAD were poor. Owing to the diversity of conditions treated and the poor quality of most of the studies, it is not possible to say that physiotherapeutic intervention is directly effective in treating panic disorder and general anxiety disorder. If physiotherapy does produce anxiolytic effect, the exact causal mechanism is likely to be complex. From the literature research there were found many studies that evaluate the effectiveness of a physiotherapeutic intervention treating a somatic disorder, including pain, where the result also indicate reduction in anxiety scores or sensation. [Møller et al., 2001; Johnsen et al., 2007; Bunkan, 2008; Stins et al., 2009; Bunkan, 2000; Rapp et al., 1984; Manzoni et al., 2008, Rollman et al., 2008, Øst et al., 2000; Stewart, 2008; Dammen, 2002; Nyboe et al., 2009; Hatayama et al., 2009; Imanishi et al., 2007; DeSantana et al., 2008; Kjellgren et al., 2007]. Further well conducted research is necessary which may be most productive if focused on specific anxiety disorders.

The main limitations of this paper are the loss of meaning in translation from other languages into English. The results from the different studies used need to be interpreted carefully, since many of the published studies about treatment vary in size and may differ between systematic and comprehensive reviews of scientific research. Even though what constitutes wellness can be debated, there are a number of studies demonstrating that the variables included in this study are among the most relevant to feeling of wellness by different approaches. To that end, outcome measures that were evaluated included anxiety and depression.

4. CONCLUSION

Anxiety disorders are a group of mental disorders that include generalized anxiety disorder (GAD), panic disorder, phobic disorders (e.g., specific phobias, agoraphobia, social phobia) and posttraumatic stress disorder (PTSD). Anxiety disorders are among the most common of all mental disorders and, when coupled with an awareness of the disability and reduced quality of life they convey, they must be recognized as a serious public health problem. This review gives an overview of what we know of GAD and PD from going through literature, together with how the generalized anxiety disorder and panic disorder can be presented in the patients with relevance to physiotherapy and different treatment

possibilities by intervention of the physiotherapist. There were found many studies that evaluate the effectiveness of a physiotherapeutic intervention treating a somatic disorder, including pain, where the results also indicate reduction in anxiety scores or sensation; however, the overall reporting of studies linked directly to the role of physiotherapy in PD and GAD were poor.

In an effort to begin to understand the link between PD and GAD to somatic symptoms and the relevance of intervention of physiotherapeutic knowledge of these disorders, the conclusion from the review of the literature is that it is of great importance to be very conscious of those psychological conditions that often presents itself as somatic burdens, as it may be the cause of many typical physiotherapeutic examination symptoms and/or the symptoms can lead to development of PD and GAD. Primarily the treatment by PT should be management based on the different somatic symptoms and presence of pain the two disorders may present.

5. REFERENCES

1. Algotsson S. Akupressur- Bedre helse og helbredelse. ©2002 N.W. DAMM OG SØN, ©2000 Sven Algotsson og ICA Förlaget AB, Västerås. ISBN 82-496-0034-7

2. American Psychiatric Association. © 2009 American Psychiatric Association. DSM-IV-TR: The Current Manual. (read 08/10/09) http://www.psych.org/mainmenu/research/dsmiv/dsmivtr.aspx

3. American Psychological Association. © 2009 American Psychological Association. Answers to Your Questions about Panic Disorder. (read 10/10/09) http://www.apa.org/topics/anxietyqanda.html

4. Amstader A. Emotion Regulation and Anxiety Disorders. J Anxiety Disord. 2008 ; 22(2): 211–221.

   http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2736046/pdf/nihms127425.pdf/?tool=pmcentrez

5. Andreassen KE, Universitetet i Bergen © 25/01/09 forskning.no. Panikkangst kureres på nettet. (read 10/10/09) http://www.forskning.no/artikler/2009/januar/207901

6. Aulid BO. Feldenkrais-entusiaster med grått hår. ©Fysioterapeuten nr 11. 2008: 32-34.

7. Berge T, Repål A. Trange rom og åpne plasser- hjelp til mestring av angst, panikk og fobier. ©2004 H.Aschehoug & Co. (W.Nygaard), Oslo, 4.revision. 2009. ISBN 978-82-03-22980-0

8. Biederman J, Petty CR, Hirshfeld-Becke DR et al.: Developmental trajectories of anxiety disorders in offspring at high risk for panic disorder and major depression. Psychiatry Res. 2007 December 3; 153(3): 245–252. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2169294/pdf/nihms-33971.pdf/?tool=pmcentrez

9. Blozik E, Laptinskaya D, Hermann-Lingen C et al.: Depression and Anxiety as Major Determinants of Neck Pain: a cross-sectional study in general practice. ©BMC Musculoskeletal Disorders 2009, 10:13; BioMed Central Ltd; 1-8.

http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2636754/pdf/1471-2474-10-13.pdf/?tool=pmcentrez

10. van Boeijen CA, van Oppen P, van Balkom AJLM et al.: Treatment of anxiety disorders in primary care practice a randomised controlled trial. ©British Journal of General Practice 2005; 55: 763–769. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1562341/pdf/bjpg55-763.pdf/?tool=pmcentrez
11. Brenes GA, Guralnik JM, Williamson JD et al.: The Influence of Anxiety on the Progression of Disability. ©J Am Geriatr Soc. 2005 January; 53(1): 34–39. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1343490/pdf/nihms5970.pdf/?tool=pmcentrez
12. Bunkan BH. Psykomotorisk fysioterapi – prinsipper og retningslinjer. ©Tidsskr Nor Lægeforen nr. 24, 2001; 121: 2845–8. http://www.tidsskriftet.no/?seks_id=412339
13. Bunkan BH. Kropp, respirasjon og kroppsbilde. ©Gyldendal Norsk Forlag AS 2001, 4. utgave, 1. opplag 2008, Oslo. ISBN 978-82-05-35-184-4
14. Cacciatore TW, Horak FB, Henry SH; Improvement in Automatic Postural Coordination Following Alexander Technique Lessons in a Person With Low Back Pain. ©Phys Ther. 2005 June ; 85(6): 565–578. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1351283/pdf/nihms7407.pdf/?tool=pmcentrez
15. Caldirola D, Bellodi L, Caumo A et al.: Approximate Entropy of Respiratory Patterns in Panic Disorder. ©Am J Psychiatry 2004; 161:79–87. http://ajp.psychiatryonline.org/cgi/reprint/161/1/79
16. Caroll R: The autonomic nervous system: Barometer of emotional intensity and internal conflict © 27/03/01 London, UK. (read 06/10/09).

http://www.thinkbody.co.uk/papers/autonomic-nervous-system.htm

17. Clark AL, Watson D: Distress and fear disorders: an alternative empirically based taxonomy of the 'mood' and 'anxiety' disorders. British Journal of Psychiatry 2006, 189, 481-483.
http://bjp.rcpsych.org/cgi/reprint/189/6/481
18. Clark DM, Salkovskis PM, Hackmann A et al.: A comparison of Cognitive Therapy, Applied Relaxation and Impramine in the Treatment of Panic Disorder. ©British Journal of Psychiatry 1994, 164, 759-769.
http://homepage.psy.utexas.edu/homepage/class/Psy364/Telch/Lectures/PDF/TreatmentofPanic.PDF
19. Coe ME: Generalized Anxiety in Late Life: Cognitive-Behavioral Therapy. ©HealthandAge.com 08/03/2008- articles. (read 08/10/09)
http://www.healthandage.com/professional/Generalized-Anxiety-in-Late-Life-Cognitive-Behavioral-Therapy
20. Cooley K, Szczurko O, Perri D, et al: Naturopathic Care for Anxiety: A Randomized Controlled Trial. © 2009 Cooley et al. PLoS ONE 4(8), e6628.
http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2729375/pdf/pone.0006628.pdf/?tool=pmcentrez
21. CureResearch.com: Statistics by Country for Generalized anxiety disorder. © 2008 Health Grades, Inc. (read 10/10/09)
http://www.cureresearch.com/g/generalized_anxiety_disorder/stats-country.htm
22. Dahl AA, Olssøn I: Generalisert angstlidelse- en lidelse preget av ukontrollerbare bekymringer og nervøs spenning. ©H. Lundbeck AS, Postboks 361, 1326 Lysaker 1-16.
http://norge.lundbeck.com/Norway/02_Helsepersonell/temahefter/PDF_filer/GAD_legehefte.pdf
23. Dammen T: Psykologiske Faktorer ved ikke-Kardiale brystsmerter. ©tidsskrift for den Norske Legeforening. Tidsskr Nor Lægeforen nr. 14, 2002; 122: 1391–5.
http://pdf.tidsskriftet.no/tsPdf.php
24. Dehdari T, Heidarnia A et al.: Effects of progressive muscular relaxation training on quality of life in anxious patients after coronary artery bypass graft surgery. ©Indian J Med Res 129, May 2009, pp 603-608.
http://www.icmr.nic.in/ijmr/2009/MAY/0520.pdf

25. DeSantana JM, Walsh DM, Vance C, et al.: Effectiveness of Transcutaneous Electrical Nerve Stimulation for Treatment of Hyperalgesia and Pain. ©Curr Rheumatol Rep. 2008 December ; 10(6): 492–499. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2746624/pdf/nihms-130619.pdf/?tool=pmcentrez
26. Duff E, Xiong J, Wang B, et al.: Complex Spatio-Temporal Dynamics of fMRI BOLD: A study of Motor Learning. ©Neuroimage. 2007 January 1; 34(1): 156–168. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1810348/pdf/nihms14587.pdf/?tool=pmcentrez
27. van Dulmen S, Sluijs E, van Dijk L, et al.: Patient adherence to medical treatment: a review of reviews. ©BMC Health Services Research 2007, **7**:55, 1-13. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1955829/pdf/1472-6963-7-55.pdf/?tool=pmcentrez
28. Engel F: The Alexander Technique- What is it? © 2009 Anne Rickover, The complete guide to the Alexander Technique. http://www.alexandertechnique.com/articles/engel/
29. Engel K, Bandelow B, et al.: Neuroimaging in anxiety disorders. ©The Author(s) 2008; J Neural Transm (2009) 116:703–716. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2694920/pdf/702_2008_Article_77.pdf/?tool=pmcentrez
30. Fox SI: Human Physiology. ©2004 The McGraw-Hill Companies, Inc, New York. Eighth edition. ISBN 0-07-111465-3
31. Gale CK, Oakley-Browne M: Generalized Anxiety Disorder. © Clin Evid 2002;8:974-90. January, 2003; BMJ Publishing Group, London, United Kingdom http://www.aafp.org/afp/20030101/british.html'
32. Garakani A, Buchsbaum MS, Newmark RW et al.: The Effect of Doxapram on Brain Imaging In Patients with Panic Disorder. ©Eur Neuropsychopharmacol. 2007 October; 17 (10): 672-686. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2695988/pdf/nihms30185.pdf/?tool=pmcentrez
33. Giardino ND, Friedman SD, Dager SR: Anxiety, Respiration and Cerebral Blood Flow: Implications for Functional Brain Imaging. ©Compr Psychiatry. 2007 ; 48(2): 103–112.

http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1820771/pdf/nihms18522.pdf

34. Goldberg S: Clinical Neuroanatomy made ridiculously simple. ©Steven Goldberg, 2003, Miami, United States of America. ISBN #0-940780-57-7
35. Goodman CC, Kelly Snyder TE: Differential Diagnosis for Physical Therapists-screening for Referral. ©2007 Sunders, Elsevier Inc, Missouri. ISBN-13: 978-0-7216-0619-4
36. Goodwin RD, Pine DS: Respiratory Disease and Panic Attacks Among Adults in the United States. © 2002 American College of Chest Physicians: Chest 2002;122;645-650.
http://chestjournal.chestpubs.org/content/122/2/645.full.pdf
37. Gorman JM, Coplan JD: Comorbidity of depression and panic disorder. ©J Clin Psychiatry. 1996;57 Suppl 10:34-41; discussion 42-3. New York, USA.
http://www.ncbi.nlm.nih.gov/pubmed/8917130
38. Greene A: Autogenic Therapy: life force management for health. © BH Med Assoc Journal - Holistic Health, summer 1999.

http://www.autogenic-therapy.org.uk/0001/news-08.htm

39. Grillon C: Models and mechanisms for anxiety: evidence from startle studies. ©Psychopharmacology (Berl). 2008 August; 199(3): 421–437.

http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2711770/pdf/nihms118500.pdf/?tool=pmcentrez

40. Gullberg J: Dynamisk Psykiatri. 5. utgave. ©Johan gullberg og Tano Aschehoug 1999, Forlaget Natur och Kultur. ISBN: 82-518-3815-0

41. Guyton AC, Hall JE: Textbook of Medical Physiology. Tenth edition. ©2000 W.B Saunders Company, Philadelphia, Pennsylvania, USA. ISBN 0-7216-8677-X International edition ISBN 0-8089-2187-8

42. Harrison P, Geddes J, Sharpe M: Lecture Notes: Psychiatry. Ninth edition. ©2005 PJ. Harrison, J.R. Geddes and M. Sharpe. Published by Blackwell Publishing Ltd. ISBN-10: 1-4051-1869-5

43. Hasler G, Fromm S, Alvarez RP et al.: Cerebral Blood Flow in Immediate and Sustained Anxiety. © 2007 Society for Neuroscience. J Neurosci. 2007 June 6; 27(23): 6313–6319.

http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2713601/pdf/nihms118553.pdf/?tool=pmcentrez

44. Hatayama T, Kitamura S, Tamura C, et al.: The Facial massage reduced anxiety and negative mood status, and increased sympathetic nervous activity. ©Biomedical Research 29 (6) 317-320, 2008, Japan.

http://www.jstage.jst.go.jp/article/biomedres/29/6/317/_pdf

45. Hegel MT, Ferguson R: Psychophysiological Assessment of Respiratory Function in Panic Disorder: Evidence for a Hyperventilation Subtype. ©Psychosomatic Medicine 59:224-230 (1997), Lebanon, New Hampshire.
http://www.psychosomaticmedicine.org/cgi/reprint/59/3/224

46. Henning ER, Turk CL, Mennin DS et al.: Impairment and Quality of life in individuals with General Anxiety Disorder. ©Depression and Anxiety 24:342–349 (2007), Wiley-Liss, Inc
http://www.personal.kent.edu/~dfresco/Fresco_Papers/Henning_et_al_Impairment_and_QOL_in_GAD_2007.pdf

47. Hildrum B, Mykletun A et al.: Effect of anxiety and depression on blood pressure: 11-year longitudinal population study. ©The British Journal of Psychiatry (2008) 193, 108–113.
http://bjp.rcpsych.org/cgi/reprint/193/2/108

48. Hoehn-Saric R, McLeod DR et al.: Somatic Symptoms and Physiologic Responses in Generalized Anxiety Disorder and Panic Disorder. An Ambulatory Monitor Study. ©Arch Gen Psychiatry. 2004;61:913-921, 2004 American Medical Association.
http://archpsyc.ama-assn.org/cgi/reprint/61/9/913

49. Homma I, Masaoka Y: Breathing rhythms and emotions. ©2008 The Physiological Society, Exp Physiol 93.9 pp 1011–1021, Tokyo, Japan,.
http://ep.physoc.org/content/93/9/1011.full.pdf+html

50. Howland RD, Mycek MJ: Lippincott`s Illustrated Reviews: Pharmacology- 3rd edition. ©2006 Lippincott Williams and Wilkin, Philadelphia, USA. ISBN 0-7817-4118-1

51. Imanishi J, Kuriyama H, Shigemori I et al.: Anxiolytic Effect of Aromatherapy Massage in Patients with Breast Cancer. © 2007 The Author(s). eCAM 2009;6(1)123–128. http://ecam.oxfordjournals.org/cgi/reprint/6/1/123
52. Institute of Serenity: The Benefits of Autogenic Training. ©2009 Monika Walter. http://www.autogenictraining.net/benefits_of_at.htm
53. Janda V: On the Concept of Postural Muscles and Posture in Man. ©The Australian Journal of Physiotherapy Vol 29, No 3, June 1983, 83-84. http://ajp.physiotherapy.asn.au/AJP/vol_29/3/AustJPhysiotherv29i3Janda.pdf
54. Jin J, Sklar GE et al.: Factors affecting therapeutic compliance: A review from the patient's perspective. © 2008 Dove Medical Press Limited. Therapeutics and Clinical Risk Management 2008:4(1) 269–286. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2503662/pdf/tcrm-0401-269.pdf/?tool=pmcentrez
55. Johnsen H: Trening som smertestillende. ©25.10.2007 Fysioterapeuten, Oslo Pixelhospitalet. http://www.fysioterapeuten.no/xp/pub/venstre/nyheter/254559
56. Katona C, Cooper D, Robertson M: Psychiatry at a Glance. Fourth edition. ©2008 The authors. Blackwell Publishing. ISBN: 978-4051-8117-4
57. Kearney G, Cioppa-Mosca J, Peterson MGE et al.: Physical Therapy and Complementary and Alternative Medicine: An Educational Tool for Enhancing Integration. ©Hospital for Special Surgery 2007, HSSJ (2007) 3: 198–201. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2504262/pdf/11420_2007_Article_9055.pdf/?tool=pmcentrez
58. Kendall FP, McCreary EK, Provance PG: Muscles Testing and Function. Fourth edition with Posture and Pain. ©1993 Lippincott Williams and Wilkins, Philadelphia, Pennsylvania. ISBN 0-683-04576-8
59. Kirkwood G, Rampes H, Tuffrey V et al.: Yoga for anxiety: a systematic review of the research evidence. ©Br J Sports Med 2005;39 :884–891. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1725091/pdf/v039p00884.pdf
60. Kirste U, Haugestad GK: Kroniske Bekkensmerter hos Kvinner. ©Tidsskr Nor Lægeforen 2002; 122: 1223–7.

http://www.hf.hio.no/mensend/studenter/2aar/temaundervisningen/Dokumenter/Kroniske%20bekkensmerter.pdf

61. Kjellgren A, Bood SÅ, Axelsson K et al.: Wellness through a comprehensive Yogic breathing program – A controlled pilot trial. © 2007 Kjellgren et al; licensee BioMed Central Ltd. BMC Complementary and Alternative Medicine 2007, **7**:43, 1-8. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2231388/pdf/1472-6882-7-43.pdf/?tool=pmcentrez
62. Kjensli B: Vil banke vekk problemer. ©12/10/2009 forskning.no, Oslo. http://www.forskning.no/artikler/2009/oktober/231545
63. Krugman M: Beginner`s Guide to Feldenkrais Method Lessons. © SenseAbility*;* Feldenkrais, Educational Foundation of North America; Issue # 24, 3rd Quarter, 2002. http://www.feldenkrais.com/download/senseability/sense24.pdf
64. Kunik ME, Roundy K, Veazey C et al.: Surprisingly High Prevalence of Anxiety and Depression in Chronic Breathing Disorders. © 2005 American College of Chest Physicians. Chest 2005;127;1205-1211. http://chestjournal.chestpubs.org/content/127/4/1205.full.pdf+html
65. Kuriyama H, Watanabe S, Nakaya T et al.: Immunological and Physiological benefits of Aromatherapy Massage. © The Author (2005). Published by Oxford University Press. eCAM 2005;2(2)179–184. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1142199/pdf/neh087.pdf
66. Kvaal K: Pasientene med de stille lidelsene. Angst og depresjon hos de kronisk somatisk syke eldre. ©Fysioterapeuten nr. 10/1999. http://www.fysioterapeuten.no/xp/pub/mx/filer/1099_Fagartikkel.pdf
67. Lader M, Bruce M: States of Anxiety and their Induction by Drugs. ©Br. J. clin. Pharmac. (1986), 22, 251-261. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1401129/pdf/brjclinpharm00124-0008.pdf
68. Lehrer PM, Karavidas MK, Lu SE et al.: Psychological treatment of Comorbid Asthma and Panic Disorder: A Pilot Study. ©J Anxiety Disord. 2008 May ; 22(4): 671–683. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2517172/pdf/nihms47704.pdf/?tool=pmcentrez

69. Letnes O, Norsk forskningsråd: Panikklidelse kan gi Brystsmerter. ©31/10/2002 forskning.no, Oslo. (read 10/10/09) http://www.forskning.no/artikler/2002/oktober/1035794173.2
70. Leverone B: Stress Reduction- recognize, relax and recover. © SenseAbility; Feldenkrais, Educational Foundation of North America; Issue # 27 2nd Quarter, 2003. http://www.feldenkrais.com/download/senseability/sense27.pdf
71. Lewit K: Manipulative Therapy in Rehabilitation of the Locomotor System. Third edition. ©Reed Educational and Professional Publishing Ltd 1999. ISBN 0 7506 2964 9
72. Lewit K, Ellis RM: Manipulative Therapy- Musculoskeletal Medicine. ©2007 Elsevier GmBH, Urban and Fischer. ISBN: 9-780-7020-3056-7
73. Manjula M, Kumariah V et al.: Cognitive behavior therapy in the treatment of panic disorder. ©Indian J Psychiatry 2009;51:108-16. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2755166/pdf/IJP-51-108.pdf
74. Manzoni GN, Pagnini F et al.: Relaxation training for anxiety: a ten-years systematic review with meta-analysis. © 2008 Manzoni et al; licensee BioMed Central Ltd. BMC Psychiatry 2008, **8**:41, 1-12. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2427027/pdf/1471-244X-8-41.pdf
75. Marazitti D, Mungai F, Vivarelli L et al.: Pain and psychiatry: a critical analysis and pharmacological review. © 2006 Marazziti et al; licensee BioMed Central Ltd. Clinical Practice and Epidemiology in Mental Health 2006, **2**:31. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1660535/pdf/1745-0179-2-31.pdf/?tool=pmcentrez
76. Marchesi C: Pharmacological management of Panic Disorder. © 2008 Dove Medical Press Limited. Neuropsychiatric Disease and Treatment 2008:4(1) 93–106. http://www.dovepress.com/getfile.php?fileID=2142
77. Martinsen EW: Fysisk aktivitet for sinnets helse. ©Tidsskr Nor Lægeforen 2000 No. 25; 120:3054-6 http://www.tidsskriftet.no/index.php?seks_id=198276
78. Mehring WE, Gopisetty V, Daubenmier J et al.: Body Awareness: Construct and Self-Report Measures. © 2009 Mehling et al. PLoS ONE 4(5): e5614.

http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2680990/pdf/pone.0005614.pdf/?tool=pmcentrez

79. Miller JJ, Fletcher K, Kabat-Zinn J: Three-year follow-up and clinical implications of a mindfulness meditation-based stress reduction intervention in the treatment of anxiety disorders. © 1995 Published by Elsevier Science Inc. General Hospital Psychiatry Volume 17, Issue 3, May 1995, Pages 192-200. http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6T70-3Y6PCRW-1B&_user=10&_rdoc=1&_fmt=&_orig=search&_sort=d&_docanchor=&view=c&_acct=C000050221&_version=1&_urlVersion=0&_userid=10&md5=def79d361d29bb66086e2735bde02712
80. Muntingh A, van der Feltz-Cornelis CM, van Marwijk HWJ et al.: Collaborative stepped care for anxiety disorders in primary care: aims and design of a randomized controlled trial. © 2009 Muntingh et al; licensee BioMed Central Ltd. BMC Health Services Research 2009, 9:159, 1-12. http://www.biomedcentral.com/content/pdf/1472-6963-9-159.pdf
81. Møller T, Hegna EA: Behandling i Angstgruppe- nytte og utbytte. © Tidsskr Nor Lægeforen nr. 20, 2001; 121: 2370–2. http://www.tidsskriftet.no/?seks_id=380232
82. Nilsen L: Kognitiv trening endrer hjernens biokjemi. ©Dagens Medisin 06.02.09, Schibsted og Bonnier, Oslo. http://www.dagensmedisin.no/nyheter/2009/02/06/kognitiv-trening-endrer-hj/
83. Norsk legemiddelhåndbok for helsepersonell 2004. ©Foreningen for utgivelse av Norsk legemiddelhåndbok, Oslo, Norway. ISBN: 82-90732-08-2
84. Nyboe L, Hvalsøe B: Lærebog i Psykiatri for Ergoterapeuter og Fysioterapeuter. 1 udgave, 1 oplag. ©Munksgaard Danmrak, København 2009. ISBN 978-628-0643-6
85. Ospina MB, Bond TK, Karkhaneh M et al.: Meditation Practices for Health: State of the Research. ©Evidence Report/Technology Assessment No. 155. (Prepared by the University of Alberta Evidence-based Practice Center under Contract No. 290-02-0023.) AHRQ Publication No.07-E010. Rockville, MD: Agency for Healthcare Research and Quality. June 2007. http://www.ahrq.gov/downloads/pub/evidence/pdf/meditation/medit.pdf

86. Parslow R, Morgan AJ, Allen NB et al.: Effectiveness of complementary and self-help treatments for anxiety in children and adolescents. © MJA, Volume 188 Number 6, 17 March 2008; 355-359. http://www.mja.com.au/public/issues/188_06_170308/par11060_fm.pdf
87. Pasienthåndboka: Angst, Generalisert angstlidelse, Panikkangst. ©1999-2009 Norsk Helseinformatikk AS. (read October, 2009) http://nhi.no/sok?query=angst
88. Pasquini M, Berardelli I: Anxiety levels and related pharmacological drug treatment: a memorandum for the third millennium. © Ann Ist Super Sanita. 2009;45(2):193-204. http://www.ncbi.nlm.nih.gov/pubmed/19636172?ordinalpos=4&itool=EntrezSystem2.PEntrez.Pubmed.Pubmed_ResultsPanel.Pubmed_DefaultReportPanel.Pubmed_RVDocSum&log$=freejr
89. Peters RK, Benson H, Peters JM: Daily Relaxation Response Breaks In a Working Population: II. Effects On Blood Pressure. © AJPH October, 1977, Vol. 67, No. 10: 954-959. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1653726/pdf/amjph00485-0058.pdf/?tool=pmcentrez
90. Ramsdal R: Litt angst forlenger livet. ©Aftenposten, Uke 33, August 12, 2009 Nr. 338, 150 årgang; 1-2.
91. Rapp MS, Thomas MR, Leith MG: Muscle relaxation techniques: a therapeutic tool for family physicians. © Can Med Assoc J, Vol. 130, March 15, 1984; 691-694. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1875949/pdf/canmedaj01411-0039.pdf
92. Rasim, Somer, Diler: Panic Disorder in Children and Adolescents. ©Yonsei Medical Journal, Vol. 44, No. 1, pp. 174-179, 2003 http://www.eymj.org/Synapse/Data/PDFData/0069YMJ/ymj-44-174.pdf
93. Redfern MS, Furman JM, Jacob RG: Visually Induced Postural Sway in Anxiety Disorders. © J Anxiety Disord. 2007 ; 21(5): 704–716. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1975822/pdf/nihms-25885.pdf
94. Ressler KJ, Mayberg HS: Targeting abnormal neural circuits in mood and anxiety disorders: from the laboratory to the clinic. ©Nat Neurosci. 2007 September; 10(9): 1116–1124.

http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2444035/pdf/nihms55932.pdf/?tool=pmcentrez

95. Rollman BL, Belnap BH, Muzumdar S et al.: A Randomized Trial to Improve the Quality of Treatment for Panic and Generalized Anxiety Disorders in Primary Care. © Arch Gen Psychiatry. 2005;62:1332-1341. http://archpsyc.ama-assn.org/cgi/reprint/62/12/1332
96. Roxendal, G: Body-Awareness Therapy and the Body Awareness Scale, treatment and evaluation in Psychiatric Physiotherapy. © Sweden, Kompendietryckeriet, Kållered, 1985. ISBN 91-7222-853-9
97. Rønning A: Lytt til pusten. ©21/09/09 forskning.no, Oslo. (read 20/10/09) http://www.forskning.no/artikler/2009/september/229670
98. Sardinha A, Rocha Freire RC et al.: Respiratory manifestations of panic disorder: causes, consequences and therapeutic implications. © J Bras Pneumol. 2009 ;35(7): 698-708. http://www.scielo.br/pdf/jbpneu/v35n7/v35n7a12.pdf
99. Sargent JD, Green EE, Walters ED: Preliminary Report on the Use of Autogenic Feedback Training in the Treatment of Migraine and Tension Headaches. © Psychosomatic Medicine Vol.35, No.2 (March-April 1973)
100. SBU: Behandling av ångestsyndrom- en systematisk litteraturöversikt, Volum 1. ©SBU- Statens beredning för medicinsk utvärdering, Stockholm,Sweden, Elanders Infologistics Väst AB, Mölnlycke 2005. ISBN 91-87890-98-4
101. Shelton CI: Diagnosis and Management of anxiety Disorders. ©JAOA • Vol 104 • No 3_suppl_1 • March 2004 • 2-5. http://www.jaoa.org/cgi/content/full/104/3_suppl_1/S2
102. Stanley MA, Wilson NL, Novy DM et al.: Cognitive behavior Therapy for Generalized Anxiety Disorder Among Older Adults in Primary Care: A Randomized Clinical Trial. ©*JAMA*. 2009;301(14): 1460-1467. http://jama.ama-assn.org/cgi/reprint/301/14/1460
103. Statens Helsetilsyn: Angstlidelser- kliniske retningslinjer for utredning og behandling. ©Statens Helsetilsyn, Utredningsserien 4:99, Oslo 2000, 1-70. http://folk.ntnu.no/flovig/Rundskriv%20og%20behandlingsveiledninger/Angstlidelser%20IS-2694.pdf

104. Stewart E, Høyskolen i Oslo: Mensendieck mot kroniske smerter. © 14.02.08; forskning.no, Oslo. http://www.forskning.no/artikler/2008/februar/1202827355.51

105. Stins JF, Ledebt A, Emck C et al.: Patterns of Postural Sway in High Anxious Children. © 2009 Stins et al; licensee BioMed Central Ltd. Behavioral and Brain Functions 2009, 5:42, 1-9. http://www.behavioralandbrainfunctions.com/content/pdf/1744-9081-5-42.pdf

106. Subramanya P, Telles S: Effect of two yoga-based relaxation techniques on memory scores and state anxiety. © 2009 Subramanya and Telles; licensee BioMed Central Ltd. BioPsychoSocial Medicine 2009, 3:8, 1-5. http://www.bpsmedicine.com/content/pdf/1751-0759-3-8.pdf

107. Søderlund ALM: Angst og Skolevegring- en teoretisk studie. ©2008 Søderlund, Universitetet i Tromsø; 1-75. http://www.ub.uit.no/munin/bitstream/10037/1455/1/thesis.pdf

108. The Society for Neuroscience: Brain Facts- a primer on the brain and nervous system. Fourth edition. © 2002 The Society for Neuroscience, Washington, USA; Everbest Printing Company. ISBN 0-916110-00-1

109. Thoeringer CK, Ripke S, Unschuld PG et al.: The GABA transporter 1 (SLC6A1): a novel candidate gene for anxiety disorders. ©The Author(s) 2008. J Neural Transm (2009) 116:649–657. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2694916/pdf/702_2008_Article_75.pdf

110. Twomey LT, Taylor JR: Physical Therapy of the Low Back. Third edition. ©2000 Churchill Livingstone, Pennsylvania, USA. ISBN 0-443-06552-7

111. Ulvik A, Haaland G: DEL 3-Kapittel 2: Kriser og Katastrofer. © 04.09.2001 Norsk barne- og ungdoms- psykiatrisk forening, Den Norske Legeforening. http://www.legeforeningen.no/id/4828

112. Vagnerova M: Psychopatologie pro pomáhajici profese. ©2004 Portal, Praha. ISBN 80-7178-802-3

113. Valenca AM, Falcão R, Freire RC et al.: The relationship between the severity of asthma and comorbidites with anxiety and depressive disorders- brief report. ©Rev Bras Psiquiatr, 2006, Brazil. http://www.scielo.br/pdf/rbp/v28n3/2274.pdf

114. Vibe M: Oppmerksomhetstrening – en metode for selvregulering av helse. © Tidsskrift for Den norske legeforening, Tidsskr Nor Lægeforen nr. 21, 2003; 123: 3062–3.
http://www.tidsskriftet.no/index.php?seks_id=914335

115. Vøllestad J: Oppmerksomt nærvær: Meditative teknikker som utgangspunkt for psykologisk behandling. ©Tidsskrift for Norsk Psykologforening, Vol 44, nummer 7, 2007, side 860-867.
http://www.psykologtidsskriftet.no/index.php?seks_id=26239&a=2&sok=1

116. Way LW, Doherty GM: Current Surgical- Diagnosis and Treatment. Eleventh edition. ©2003 The McGraw-Hill companies, INC, USA. ISBN: 0-8385-1456-1

117. van der Wee NJ, van Veen F, van Vliet IM et al.: Increased Serotonin and Dopamine Transporter Binding in Psychotropic Medication–Naïve Patients with Generalized Social Anxiety Disorder Shown by 123I-b-(4-Iodophenyl)-Tropane SPECT. ©2008 by the Society of Nuclear Medicine, Inc. J Nucl Med 2008; 49:757–763.
http://jnm.snmjournals.org/cgi/reprint/49/5/757

118. Wells, A: Cognitive Therapy of Anxiety Disorders- A practice Manual and Conceptual guide. ©1997 John Wiley & Sons Ltd, The Atrium, Southern Gate, Chichester, West Sussex, England. Reprinted 2008. ISBN13: 978-0-471-96474-2 (HB)

119. Werner R: A Massage Therapist's Guide to Pathology. Third edition. ©2005 Lippincott Williams & Wilkins, Philadelphia, USA. ISBN 0-7817-5489-5

120. Whalen PJ, Johnstone T, Somervile LH et al.: A Functional Magnetic Resonance Imaging Predictor of Treatment Response to Venlafaxine in Generalized Anxiety Disorder. Biol Psychiatry. 2008 May 1; 63(9): 858–863.
http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2654286/pdf/nihms-83729.pdf/?tool=pmcentrez

121. WHO: The ICD-10 Classification of Mental and Behavioral Disorders- Diagnostic criteria for research. ©World Health Organization 1993, 2009, Geneva. (read 13/10/09)
http://www.who.int/classifications/icd/en/GRNBOOK.pdf
http://www.who.int/classifications/icd/en/bluebook.pdf

122. WHO: International classification of functioning, disability and health. ©World Health Organization, 2001, Geneva; WHO Library Cataloguing- in Publication data. ISBN (92 4 154542 9)

123. Williams D: Communation Skills in Practice- A Practical Guide for Health Professionals. © 1997 Diane Williams, Library of Congress Cataloging in Publication Data; Great Britain. ISBN 1-85302-232-2

124. Øst LG: Applied Relaxation: Description of a Coping Technique and Review of Controlled Studies. ©Pergamon Journals, Ltd, Behav. Res. Ther. Vol. 25, No. 5, pp. 397-409, 1987. http://www.cb1.com/~john/misc/relax.html

125. Øst LG, Breitholtz E: Applied relaxation vs. cognitive therapy in the treatment of generalized anxiety disorder. © 2000 Elsevier Science Ltd. Behavior Research and Therapy 38 (2000) 777-790. http://homepage.psy.utexas.edu/Homepage/Class/Psy394Q/Behavior%20Therapy%20Class/Assigned%20Readings/GAD/Ost2000.pdf

6. LIST OF APPENDIXES

GENERALISED ANXIETY DISORDER SCALE (GADS)

1. How distressing/disabling have your worries been in the last week?

0	1	2	3	4	5	6	7	8
Not at all				*Moderately*				*Extremely—The worst they have ever been*

2. In the past week how much effort have you put into trying to control your worries?

0	1	2	3	4	5	6	7	8
None at all				*Moderate effort*				*Full effort—I could not try more*

3. Place a number from the scale below next to each item to show how often in the past week you have done the following in order to cope with your worry.

0	1	2	3	4	5	6	7	8
Not at all				*Half of the time*				*All of the time*

(a) Tried to distract myself ____
(b) Tried to control my thinking ____
(c) Tried to reason things out ____
(d) Asked for reassurance ____
(e) Talked to myself ____
(f) Tried not to think about things ____
(g) Looked for evidence ____
(h) Acted cautiously ____
(i) Planned how to cope if my worries were true ____

4. How often in the past week have you avoided the following in order to prevent worrying? Place a number from the scale below next to each item.

0	1	2	3	4	5	6	7	8
Not at all				*Half of the time*				*All of the time*

(a) News items ____
(b) Social situations ____
(c) Uncertainty ____
(d) Thoughts of illness ____
(e) Thoughts of accidents/loss ____
(f) Other (specify): ____
_____ ____
_____ ____

5. Below are a number of thoughts that people have about their worries. Indicate how much you believe each one by placing a number from the scale below next to each one.

0	10	20	30	40	50	60	70	80	90	100
Do not believe the thought										*Completely convinced the thought is true*

I could go crazy with worry ____
Worrying could harm me ____
Worrying puts my body under stress ____
If I don't control my worry it will control me ____
My worrying is uncontrollable ____
If I worry too much I could lose control ____
Worrying helps me cope ____
If I worry I'll be prepared ____
Worrying keeps me safe ____
Worrying helps me get things done ____
Something bad would happen if I didn't worry ____
Worrying helps me solve problems ____

_____

Fig. 5.1 GADS [Wells, 2008]

- Have you been under a lot of stress lately?
- Are you having some trouble coping with life in general and/or life's tensions?
- Do you feel exhausted or overwhelmed mentally or physically?
- Does your mind go blank, or do you have trouble concentrating?
- Do you have trouble sleeping at night (e.g., difficulty getting to sleep, staying asleep, restless sleep, feel exhausted upon awakening)? Focusing during the day?
- Do you worry about finances, work, or life in general?
- Do you get any enjoyment in life?
- Do you feel keyed up or restless? Irritable and jumpy? On edge most of the time?
- Do you have a racing heart, unexplained dizziness, or unexpected tingling in your face or fingers?
- Do you wake up in the morning with your jaw clenched or feeling sore muscles?
- Do you have a general sense of dread or unknown fears?
- Do you have any of these symptoms: a racing heart, dizziness, tingling, muscle or joint pains?

Fig. 5.2. Screening for Anxiety [Goodman et al., 2007]